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# An Evaporation Survey of Ohio

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OHIO
AGRICULTURAL EXPERIMENT STATION
Wooster, Ohio

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# AN EVAPORATION SURVEY OF OHIO

J. D. WILSON AND J. R. SAVAGE[1]

## INTRODUCTION

The importance of moisture, both in the air and soil, in the development and survival of plant and animal life is universally appreciated. Ecological literature is replete with references dealing with the response of land-inhabiting plants and animals to an abundance or scarcity of moisture. Not only is it frequently necessary for the individual to adjust itself to variations in this environmental factor, but species have undergone, over long periods of time, great and often singular modifications in form and development in their struggle for survival in regions either extremely wet or dry.

The chief determinant of the wetness or dryness of most regions is, of course, the quantity of water which they receive as rain. However, the rate at which this is in turn lost should also be considered more carefully than many realize. Evaporation is modified by such factors as altitude, slope, soil characteristics, light, temperature, barometric pressure, and the moisture content and velocity of moving air. The ability of the rainfall of a region to supply water for plant growth is chiefly dependent on timeliness, the portion of it which is retained by the soil, and the rate at which it is lost by evaporation. Timeliness is particularly important in certain areas, such as the Great Plains Region of the United States. The yearly rainfall in much of this section does not greatly exceed 20 inches; this, under some circumstances, is too little for good crop production, but, because of the fact that a large portion of it occurs here at a time when temperatures are favorable for plant growth, certain crops may be grown very successfully during most seasons (35). The sand-dune region along the southeastern shore of Lake Michigan may be cited as an example of the importance of the water-retaining properties of the soil in regulating plant growth (17, 25, 50), since much of the vegetation of this district is more xerophytic in type than in closely adjacent territory with no greater rainfall. The effect of variations in the evaporation rate on plant growth is not always so clearly defined as that of the two environmental factors just mentioned, except in certain areas where the rate of loss from a freely exposed water surface is considerably in excess of the amount of water falling as rain (7, 14, 35, 48).

Rainfall is recorded daily at hundreds of stations throughout the United States; whereas evaporation is measured, even during the growing season, at only comparatively few. During drouth periods interest usually centers around the lack of rainfall, with little consideration for the fact that the degree of dryness is being rapidly accentuated by evaporation rates which may be two or three times as great as during periods of more normal weather. However, the significance of variations in the evaporation rate in regulating plant and animal behavior in their various habitats has been recognized by a large group of ecologists, with the result that many investigations which included this

[1]The authors wish to acknowledge their indebtedness to the following: Dr. N. F. Howard, of the United States Department of Agriculture, Bureau of Entomology and Plant Quarantine; Dr. E. N. Transeau, of the Department of Botany of the Ohio State University; and Dr. L. L. Huber and R. R. Paton, of the Departments of Entomology and Forestry, respectively, of this Station, without whose help in instigation and completion this survey could not have been made.

environmental factor have been made. These have varied widely in the territory and time involved. The most extensive are those of Russell (58), Livingston (40), and Davidson (14); the longest, those of Hauk (26), Horton (28), Karper (33), and Linney (37). Others which have involved comparatively large areas for a year or more were made by Davidson (13), Kimball (34), Livingston (39), and Shapovalov (62). Actual measurements of evaporation were made in most of the above instances, but Russell (58) and Davidson (13, 14) estimated, as closely as possible, what the rates should have been from known values of other related and regulatory factors. Other investigations involving measurements of evaporation in restricted areas or for short periods of time have been numerous; only a few of these need be referred to here however (5, 17, 18, 20, 21, 31, 44, 49, 57, 77, 82, 86). A portion of these studies in which the evaporation factor has been evaluated has been made for the purpose of determining the effect of the environmental complex on the evaporation rate; whereas in others a better knowledge of the effect of variations in the evaporation rate on the behavior of plants and animals has been the objective.

In the first of these two groups the influence of large differences in altitude has been observed by Livingston (38) and Shreve (70, 71), who found evaporation to decrease with an increase in altitude. This is largely due to a corresponding decrease in temperature (79). In restricted areas near the ground the variations in evaporation may be quite great, with a rapid increase from the soil surface up to a point somewhat above the top of surrounding vegetation. This is chiefly caused by an increase in light and the rate of air movement and by a decrease in relative humidity at successive stages above the soil surface (5, 12, 21, 54, 57, 67, 68, 72, 90). Exposure of the site at which the evaporation rate is being determined, with special reference to size, density, character, and proximity of surrounding vegetation, is also an important regulatory factor and has been noted by a number of investigators. The use of windbreaks to decrease the evaporation rate is important in this connection (4).

In the second group, which includes studies dealing with the effect of the evaporation factor on plant and animal life, Transeau (76) was the first to consider the relation between rainfall-evaporation ratios and the distribution of vegetation, particularly with reference to the eastern United States. He made use of the relation between the quantity of water received as rain and the calculated loss by evaporation and the effect of this rainfall-evaporation ratio in delimiting the various vegetation formations. Other investigators later used this ratio in studying the influence of the environment on the distribution of plants and animals (13, 39, 40, 42, 53, 59, 61). Forests were found to flourish chiefly in regions where the rainfall-evaporation was equal to, or greater than, one. With a progressive decrease in this value below one, due to a lower rainfall or higher evaporation, or both, prairie types first become dominant; with still further change, the country becomes semi-desert or desert, with only xerophytic types surviving. However, areas of similar rainfall may vary widely in their adaptability for crop production because of differences in the rate at which the water received as rain is later lost through evaporation (7, 8, 35, 36, 47).

The physiological responses of various plants to extremely high or low evaporation rates have been reported in innumerable instances in literature dealing with the ecology and pathology of plants (85). High evaporation has been noted as being contributory to disorders such as mottle-leaf of citrus (23), various physiological diseases of apple fruits (3), leaf scorching and even death of various trees (32, 74, 84), failure of wheat to produce kernels in certain heads (55), death of seedling trees on the forest floor (68), and desiccation and death of plants sprayed with Bordeaux mixture (87). Examples of other disorders most prevalent under conditions of low evaporation are oedema of many plants, including the apple (27), and also water core of apple (51).

The relationships existing between the evaporation rate and animal behavior, particularly that of insects, have been studied by a number of investigators. Shelford (63, 64, 65) and Cameron (9) consider a knowledge of the evaporation rate of a given environment to afford a good index of the combined effect of a number of factors in the environmental complex on animal and insect metabolism. The influence of variations in the evaporation rate on the distribution and behavior of various insects has been studied by Cook (10), Davidson (13), Hamilton (24), and Shelford (66). The influence of certain climatic factors which are closely related to evaporation, such as rainfall and humidity, on the distribution and survival of certain insects has been studied by various investigators, including Cook (10, 11), Graf (22), Marcovitch and Stanley (46), and Sweetman (75). The relation of various ecological factors of the habitat to the distribution and population of the European corn borer (*Pyrausta nubilalis* Hubn.) has been discussed by Huber (30, 31), Transeau (78), and Savage (60). This insect was found to accumulate most rapidly in areas which were originally swamp forest and in reclaimed marsh lands where the water table and soil-moisture content were consistently high.

These preliminary observations concerning the evident relationship between the ecology of the habitat and the prevalence of the corn borer were responsible for the initiation of a detailed study of the values of certain environmental factors in various habitats in which the insect was plentiful or scarce. At the time the work on the corn borer was in progress in northern Ohio and the Lake Erie region, Howard (29) was conducting a similar investigation in the southern part of the State on the Mexican bean beetle (*Epilachna corrupta* Muls.).

Evaporation was one of the factors which it was decided to investigate, and in the spring of 1926 a cooperative project was organized, in which the U. S. Bureau of Entomology, the Botany Department of the Ohio State University, and the Department of Entomology at the Experiment Station participated in establishing nearly 30 stations at which evaporation was to be measured (see footnote on Page 3). These stations were scattered over Ohio, with one in Michigan and five in Ontario, Canada. Two years later the project was modified, and the Departments of Agronomy, Botany, and Forestry at the Ohio Agricultural Experiment Station also joined in conducting the survey, which was then continued until the fall of 1931 (88). Over 40 stations were in operation in 1930, with a few less in 1931. Standardized, spherical, white atmometers (41) were used in determining the evaporation rates throughout the 6-year period of the survey. The procedure used in establishing and maintaining the stations and in collecting and recording the data is discussed in the following pages.

## METHODS AND APPARATUS

The period of this survey has been divided into two parts, chiefly for convenience in discussion. Many of the stations used in either 1926 or 1927, or both, were not included in the more complete 4-year survey which covered the period from 1928 to 1931, inclusive. Also, the data for several of the stations included during 1926 and 1927 were not complete for a 16-week period, such as was used in the later 4-year survey. The evaporation during these missing intervals was later estimated to complete the 16-week periods, as may be noted in Table 3, A and B.

The various stations used in the 1926 and 1927 survey are listed in Table 1, where they are arranged in alphabetical order. Each station has a corresponding number and these numbers may be used to identify each station in Figure 1. The county in which each station was located, the years during which it was established, and the type of climax forest characteristic of the territory immediately surrounding it[2] are also indicated in Table 1. The same information concerning the stations used in the 1928-1931 period is given in Table 2 and Figure 2.

**TABLE 1.—Stations Used in the 1926 and 1927 Survey**

| Station | | County | Forest type at station | Years placed |
|---|---|---|---|---|
| No. | Location | | | |
| 1 | Ada | Hardin | Beech-Maple and Swamp Forest | 1926 and 1927 |
| 2 | Athens | Athens | Beech-Maple | 1926 and 1927 |
| 3* | Aylmer | Elgin, Ontario | Beech-Maple-Pine-Hemlock | 1926 and 1927 |
| 4 | Bryan | Williams | Beech-Maple | 1926 |
| 5 | Caldwell | Noble | Beech-Maple | 1926 and 1927 |
| 6 | Carroll | Fairfield | Beech-Maple | 1926 and 1927 |
| 7 | Chillicothe | Ross | Beech-Maple | 1926 and 1927 |
| 8 | Columbus | Franklin | Beech-Maple | 1926 and 1927 |
| 9 | Cortland | Trumbull | Beech-Maple | 1926 |
| 10 | Enterprise | Hocking | Oak-Hickory | 1926 and 1927 |
| 11 | Frankfort | Ross | Beech-Maple | 1927 |
| 12 | Greenville | Darke | Beech-Maple | 1926 |
| 13* | Guelph | Wellington, Ontario | Beech-Maple-Pine-Hemlock | 1926 |
| 14* | Harrow | Essex, Ontario | Oak-Hickory | 1926 |
| 15 | London | Madison | Oak-Hickory and Prairie | 1926 and 1927 |
| 16 | Marietta | Washington | Beech-Maple | 1926 and 1927 |
| 17 | Minerva | Stark | Oak-Hickory | 1927 |
| 18 | Monroe | Monroe, Michigan | Swamp Oak-Hickory | 1926 |
| 19 | Mt. Healthy | Hamilton | Oak-Maple | 1927 |
| 20 | Mt. Vernon | Knox | Oak-Hickory | 1926 and 1927 |
| 21 | New Concord | Muskingum | Beech-Maple | 1926 and 1927 |
| 22 | Painesville | Lake | Beech-Maple | 1926 and 1927 |
| 23 | Paulding | Paulding | Beech-Maple-White Oak | 1926 |
| 24 | Proctorville | Lawrence | Oak-Hickory-Mixed Mesophytic | 1926 and 1927 |
| 25 | Russellville | Brown | Beech-Maple | 1927 |
| 26 | St. Clairsville | Belmont | Beech-Maple | 1926 and 1927 |
| 27 | Sandusky | Erie | Oak-Hickory and Wet Prairie | 1926 |
| 28* | St. Williams | Norfolk, Ontario | Oak-Pine | 1926 |
| 29 | Strongsville | Cuyahoga | Beech-Maple | 1927 |
| 30* | Tilbury | Essex, Ontario | Beech-Maple | 1926 |
| 31 | Upper Sandusky | Wyandot | Oak-Hickory and Prairie | 1927 |
| 32 | Washington C. H. | Fayette | Oak-Hickory and Prairie | 1926 and 1927 |
| 33 | Woodsfield | Monroe | Beech-Maple | 1926 and 1927 |
| 34 | Wooster | Wayne | Beech-Maple | 1926 and 1927 |

*Canadian stations.

As was mentioned previously, the stations used in this survey were distributed over the area involved as evenly as circumstances would permit. The group of stations located in southeastern Ohio, as shown in Figure 1, was first placed in 1926 by Howard (29) in the region of Mexican bean beetle infesta-

[2]Forest types from data furnished by Dr. E. N. Transeau.

tion, and many of these were continued by him throughout the 6-year period of the survey. Those in the area surrounding Lake Erie were placed by Huber (30, 31) in the region at that time infested with European corn borer. In 1928 the survey was entirely confined to Ohio and during this and the three following years was conducted as a cooperative project by the Federal Bureau of Entomology and the Departments of Botany, Entomology, and Forestry of the Ohio Agricultural Experiment Station.

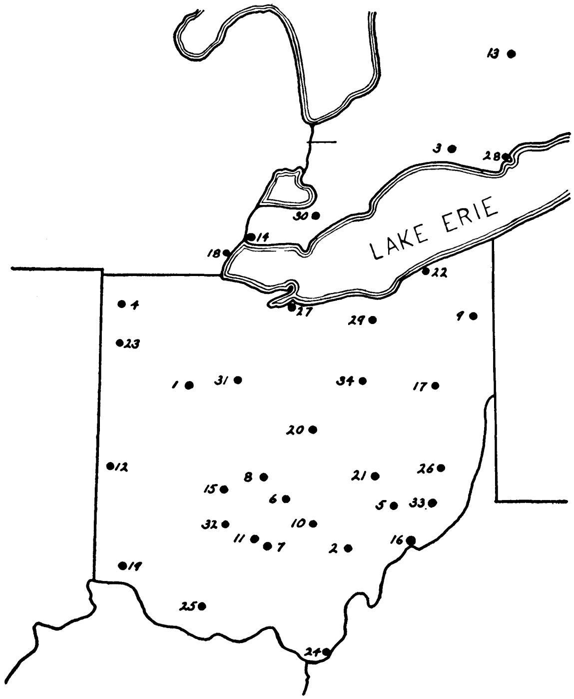


**Fig. 1.—Location of stations used in the 1926 and 1927 survey**

Weather data are usually collected at the various agricultural experiment farms scattered over Ohio, and evaporation stations were established at most of these farms during this survey. In addition to these, other stations were placed as near as possible to points decided upon previously.

In locating a station it was first necessary to find a competent observer who was willing to make the necessary measurements of evaporation each Monday morning over a period of at least 16 weeks, beginning about May 28 and continuing to approximately September 20 of each year. The instruments to be used were then placed as conveniently as possible to the home of the observer and in a position having an exposure as representative of the general group of stations as possible. In doing this it was necessary to choose a site of the same approximate elevation as the immediate surroundings and as free

**TABLE 2.—Stations Used in the 1928 to 1931 Survey**

| Station No. | Station Location | County | Forest type at station | Years placed |
|---|---|---|---|---|
| 1 | Ada | Hardin | Beech-Maple and Swamp Forest | 1929, 1930, 1931 |
| 2 | Athens | Athens | Beech-Maple | 1928, 1929, 1930, 1931 |
| 3 | Bellefontaine | Logan | Oak-Hickory and Oak-Hickory-Maple | 1928 |
| 4 | Bladensburg | Knox | Oak-Hickory | 1930 and 1931 |
| 5 | Bono | Lucas | Swamp Forest | 1928 |
| 6 | Bowling Green | Wood | Swamp Forest and Wet Prairie | 1928 and 1931 |
| 7 | Bryan | Williams | Beech-Maple | 1928, 1929, 1930, 1931 |
| 8 | Bryan Park | Greene | Oak-Hickory | 1928, 1929, 1930, 1931 |
| 9 | Caldwell | Noble | Beech-Maple | 1928 |
| 10 | Canfield | Mahoning | Beech-Maple | 1929, 1930, 1931 |
| 11 | Carpenter | Meigs | Oak-Hickory Beech-Maple in valleys | 1930 and 1931 |
| 12 | Carroll | Fairfield | Beech-Maple N.W. limit of Mixed Mesophytic | 1928, 1929, 1930, 1931 |
| 13 | Castalia | Erie | Oak-Hickory and Dry Prairie | 1928 |
| 14 | Chesapeake | Lawrence | Beech-Maple | 1931 |
| 15 | Chillicothe | Ross | Beech-Maple | 1928 and 1930 |
| 16 | Cleveland | Cuyahoga | Beech-Maple | 1928, 1930, 1931 |
| 17 | Columbus | Franklin | Beech-Maple | 1928, 1929, 1930, 1931 |
| 18 | Cortland | Trumbull | Beech-Maple | 1929, 1930, 1931 |
| 19 | Delaware | Delaware | Beech-Maple and Oak-Hickory-Maple | 1928, 1929, 1930, 1931 |
| 20 | Elyria | Lorain | Swamp Forest and Beech-Maple | 1928 |
| 21 | Enterprise | Hocking | Oak-Hickory | 1928, 1929, 1930, 1931 |
| 22 | Findlay | Hancock | Beech-Maple and Swamp Forest | 1930 and 1931 |
| 23 | Frankfort | Ross | Beech-Maple | 1928 |
| 24 | Gallipolis | Gallia | Beech-Maple and Mixed Mesophytic | 1930 and 1931 |
| 25 | Germantown | Montgomery | Beech-Maple | 1930 and 1931 |
| 26 | Hillsboro | Highland | Beech-Maple | 1930 and 1931 |
| 27 | Holgate | Henry | Swamp Forest | 1929, 1930, 1931 |
| 28 | Ironton | Lawrence | Oak-Hickory and Mixed Mesophytic | 1928 |
| 29 | Lafayette | Allen | Beech-Maple | 1928 |
| 30 | London | Madison | Oak-Hickory and Prairie | 1930 and 1931 |
| 31 | Marietta | Washington | Beech-Maple | 1928, 1929, 1930, 1931 |
| 32 | McGuffey | Hardin | Swamp Forest | 1929 |
| 33 | Mendon | Mercer | Beech-Maple | 1930 |
| 34 | Mt. Healthy | Hamilton | Oak-Maple | 1930 and 1931 |
| 35 | Mt. Vernon | Knox | Oak-Hickory | 1928 |
| 36 | New Concord | Muskingum | Beech-Maple | 1928, 1929, 1930, 1931 |
| 37 | Oak Harbor | Ottawa | Beech-Maple and Swamp Forest | 1928, 1929, 1930, 1931 |
| 38 | Owensville | Clermont | Wet Beech | 1930 and 1931 |
| 39 | Painesville | Lake | Beech-Maple | 1928 |
| 40 | Paulding | Paulding | Beech-Maple and Wet White Oak | 1929, 1930, 1931 |
| 41 | Proctorville | Lawrence | Oak-Hickory and Mixed Mesophytic | 1928 |
| 42 | Ravenna | Portage | Beech-Maple | 1928, 1929, 1930, 1931 |
| 43 | Russellville | Brown | Beech-Maple | 1929 |
| 44 | St. Clairsville | Belmont | Beech-Maple | 1928, 1929, 1930, 1931 |
| 45 | Sandusky | Erie | Oak-Hickory and Wet Prairie | 1928 |
| 46 | Shawnee | Scioto | Oak-Hickory | 1928, 1929, 1930, 1931 |
| 47 | Strongsville | Cuyahoga | Beech-Maple | 1929, 1930, 1931 |
| 48 | Toledo | Lucas | Swamp-Oak-Hickory | 1928 |
| 49 | Troy | Miami | Beech-Maple | 1930 and 1931 |
| 50 | Unionville | Ashtabula | Beech-Maple and Swamp Forest | 1930 and 1931 |
| 51 | Venice | Erie | Beech-Maple and Swamp Forest | 1930 and 1931 |
| 52 | Washington C. H.* | Fayette | Oak-Hickory and Prairie | 1928 |
| 53 | Waterloo | Athens | Beech-Maple | 1928, 1929, 1930 |
| 54 | Wauseon | Fulton | Oak-Hickory and Swamp Forest | 1928, 1929, 1930, 1931 |
| 55 | Willard | Huron | Swamp Forest | 1928, 1929, 1930, 1931 |
| 56 | Woodsfield | Monroe | Beech-Maple | 1928, 1929, 1930, 1931 |
| 57 | Wooster | Wayne | Beech-Maple | 1928, 1929, 1930, 1931 |

*Washington Court House.

as possible from interruptions to full sunlight and wind movement. This meant avoiding proximity to trees and buildings wherever possible, especially to the south and west of the atmometer site.

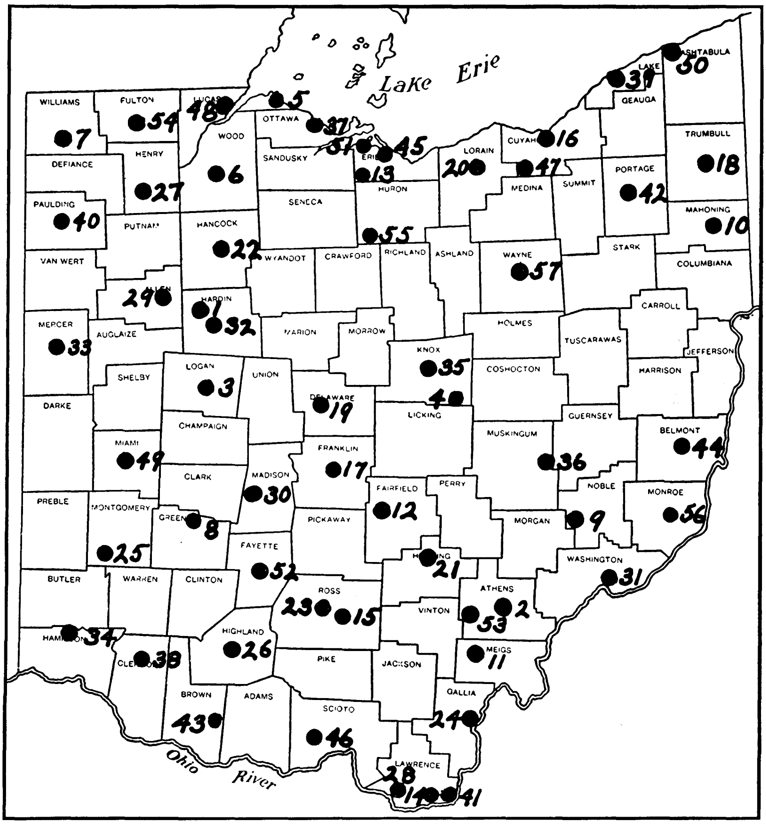

**Fig. 2.—Location of stations used in the 1928 to 1931 survey**

The Livingston type of standardized, spherical, white atmometer (41) was the instrument used in determining the evaporation rate in this survey. Three white atmometers were used at each station in most cases, but in some instances two white spheres and one blackened one were used. Three white atmometers were used whenever possible to insure a better check on possible discrepancies in losses from individual instruments than would have been possible if only two had been used. The atmometer spheres were mounted on non-absorbing valves (83) placed in 32-ounce bottles, as shown in Figure 3. The bottles were then placed in 1-quart tinned cans, which were in turn mounted on posts of such a height that, during the last 5 years of the survey, the sphere itself was 42 inches above the surface of the soil. However, in 1926 the spheres were located at heights which varied from 18 inches to 3 feet above

**Fig. 3.—Atmometer assembly similar to that used during the last 3 years of this survey.**

the soil surface. A file mark was made on the neck of each bottle at the time the assembly of atmometer, valve, cork, and bottle was completed, and the latter was then filled to this level with distilled water. At this time a small amount of mercuric chloride was added to the water in each bottle to prevent the growth of algae in the bottle and on the walls of the atmometer. A small copper tube, bent downward on the upper end, was inserted through the cork to afford a means of letting air into the tightly closed bottle to replace the water lost by the atmometer.

The non-absorbing valve mentioned above is necessary to prevent water from reentering the bottle during periods of rain when atmometers are used outdoors. During the first 3 years of this survey the Livingston-Thone (43) type of valve was used. This is constructed by trapping a globule of mercury between two plugs of glass wool and by this means water is prevented from moving downward, although it can move upward freely. This valve was found to require considerable attention to keep it and the atmometer working properly. Since many of the stations were located at a considerable distance from either Wooster or Columbus, it seemed highly desirable to obtain a valve which would operate throughout the season with little or no attention. During 1928 a modification of the Shive (69) type of valve was developed by the senior author (83). This valve was found to give very good results, even in the hands of inexperienced observers, and was used at all stations during the last 3 years of the survey.

The atmometers were placed at each station, as described above, a few days previous to the date on which the survey was to begin each spring. On Monday morning of the first week of the survey each bottle was refilled to the mark on the neck with distilled water. On each following Monday morning until the end of the survey, which was about mid-September of each year, the quantity of water needed to restore the water level to this mark was measured by means of a graduated cylinder and then recorded in terms of cubic centimeters.

It was necessary to discontinue the stations each fall before severe frosts were likely to occur, since both the bottles and the atmometer spheres are easily broken by the expansion of water in freezing. These frosts, which may be expected any time after October 1 in northern Ohio, also marked the approximate end of the growing season, beyond which time evaporation data were of decreasing value. As may be noted in Table 3, the collection of data was discontinued at the latest by September 21. The apparatus was gathered up soon after this date and the atmometers were then cleaned and standardized, ready for use again the next spring.

## RESULTS AND DISCUSSION

### *EVAPORATION*

As mentioned previously, the loss of water by the different atmometers was determined at weekly intervals and recorded in terms of cubic centimeters throughout each summer period of the survey by the observers in charge of the various stations. Each Livingston standardized atmometer bears a correction coefficient. When the measured loss is multiplied by this coefficient, a value is obtained which may then be compared with the corrected value of any and all other atmometers used in the same or other years. These corrections were made before determining the average weekly losses from the atmometers at each station at the end of each season. These average losses for each year from 1926 to 1931, inclusive, are given in Sections A, B, C, D, E, and F, respectively, of Table 3.

A number of the stations used in 1926 and 1927 were not established early enough in the growing season to permit the collection of data for a 16-week period, as may be seen in Table 3, Sections A and B. Accordingly, the loss for the 4-week period from May 31 to June 27, 1926, and May 30 to June 26, 1927, has been estimated for these stations. These values are identified by means of an asterisk in each instance. The 16-week period of observation has been divided into four 4-week periods and the total losses for these periods are included in the various sections of the table. The total losses for the 16-week period are also given. No attempt has been made to analyze these data as a group but they are presented here for future reference.

### *RAINFALL*

Rainfall is recorded daily by the U. S. Weather Bureau at approximately 130 stations in Ohio (2, 49). By reference to these records it was possible to determine the weekly totals of rainfall for the various periods corresponding to those for which evaporation data are given in the different sections of Table 3. In case rainfall records were not available at points in close proximity to atmometer stations, data from the one or two nearest rainfall stations were used. Although these weekly totals of rainfall were determined and then used in obtaining some of the summaries given in the following discussion, only the 4- and 16-week totals are given in the different sections of Table 4.

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations**

A. From May 31 to September 19, 1926

| Date | Ada | Athens | Aylmer (Canada) | Bryan | Caldwell | Carroll |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/31-6/ 6 | ........... | 115 | ........... | ........... | 163 | 232 |
| 6/ 7-6/13 | ........... | 181 | ........... | ........... | 190 | 268 |
| 6/14-6/20 | ........... | 95 | ........... | ........... | 249 | 156 |
| 6/21-6/27 | ........... | 123 | ........... | ........... | 198 | 249 |
| 6/28-7/ 4 | 218 | 138 | 249 | 130 | 187 | 235 |
| 7/ 5-7/11 | 173 | 88 | 227 | 124 | 117 | 180 |
| 7/12-7/18 | 223 | 123 | 210 | 115 | 143 | 247 |
| 7/19-7/25 | 387 | 115 | 252 | 217 | 164 | 406 |
| 7/26-8/ 1 | 138 | 80 | 157 | 195 | 146 | 91 |
| 8/ 2-8/ 8 | 139 | 65 | 101 | 133 | 102 | 143 |
| 8/ 9-8/15 | 134 | 87 | 104 | 87 | 138 | 95 |
| 8/16-8/22 | 86 | 21 | 102 | 83 | 74 | 61 |
| 8/23-8/29 | 141 | 64 | 118 | 62 | 74 | 160 |
| 8/30-9/ 5 | 70 | 65 | 131 | 78 | 128 | 91 |
| 9/ 6-9/12 | 96 | 77 | 91 | 56 | 89 | 118 |
| 9/13-9/19 | 63 | 93 | 79 | 58 | 108 | 83 |
| 5/31-6/27 | 592* | 514 | 834* | 651* | 800 | 905 |
| 6/28-7/25 | 1001 | 464 | 938 | 586 | 611 | 1068 |
| 7/26-8/22 | 497 | 253 | 464 | 498 | 460 | 390 |
| 8/23-9/19 | 370 | 299 | 419 | 254 | 399 | 452 |
| 12-week total | 1868 | 1016 | 1521 | 1338 | 1470 | 1910 |
| 16-week total | 2460* | 1530 | 2355* | 1989* | 2270 | 2815 |

| Date | Chillicothe | Columbus | Cortland | Enterprise | Greenville | Guelph (Canada) | Harrow (Canada) |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/31-6/ 6 | 132 | 269 | ........... | 95 | ........... | ........... | ........... |
| 6/ 7-6/13 | 218 | 261 | ........... | 144 | ........... | ........... | ........... |
| 6/14-6/20 | 110 | 178 | ........... | 60 | ........... | ........... | ........... |
| 6/21-6/27 | 154 | 324 | ........... | 85 | ........... | ........... | ........... |
| 6/28-7/ 4 | 161 | 253 | 234 | 167 | 259 | 190 | 246 |
| 7/ 5-7/11 | 99 | 149 | 175 | 121 | 162 | 190 | 246 |
| 7/12-7/18 | 140 | 235 | 235 | 187 | 217 | 190 | 320 |
| 7/19-7/25 | 227 | 350 | 175 | 173 | 358 | 309 | 295 |
| 7/26-8/ 1 | 127 | 78 | 180 | 110 | 248 | 135 | 187 |
| 8/ 2-8/ 8 | 106 | 137 | 175 | 101 | 99 | 170 | 202 |
| 8/ 9-8/15 | 106 | 95 | 135 | 109 | 102 | 155 | 144 |
| 8/16-8/22 | 47 | 58 | 102 | 44 | 84 | 129 | 117 |
| 8/23-8/29 | 114 | 134 | 102 | 108 | 72 | 169 | 174 |
| 8/30-9/ 5 | 98 | 87 | 107 | 85 | 80 | 154 | 136 |
| 9/ 6-9/12 | 103 | 113 | 91 | 106 | 70 | 128 | 109 |
| 9/13-9/19 | 90 | 171 | 91 | 118 | 70 | 82 | 89 |
| 5/31-6/27 | 614 | 1032 | 640* | 384 | 639* | 663* | 710* |
| 6/28-7/25 | 627 | 987 | 819 | 648 | 996 | 879 | 1107 |
| 7/26-8/22 | 386 | 368 | 592 | 364 | 533 | 589 | 650 |
| 8/23-9/19 | 405 | 505 | 391 | 417 | 292 | 533 | 508 |
| 12-week total | 1418 | 1860 | 1802 | 1429 | 1821 | 2001 | 2265 |
| 16-week total | 2032 | 2892 | 2442* | 1813 | 2460* | 2664* | 2975* |

*These values calculated.

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

| Date | London | Marietta | Monroe (Mich.) | Mt. Vernon | New Concord | Paines-ville | Paulding | Proctor-ville |
|---|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | | |
| 5/31-6/ 6 | 161 | 212 | .......... | 163 | 202 | .......... | .......... | 139 |
| 6/ 7-6/13 | 240 | 261 | .......... | 176 | 304 | .......... | .......... | 150 |
| 6/14-6/20 | 128 | 113 | .......... | 153 | 192 | .......... | .......... | 120 |
| 6/21-6/27 | 191 | 195 | .......... | 193 | 224 | .......... | .......... | 139 |
| 6/28-7/ 4 | 259 | 204 | 141 | 180 | 237 | 240 | 124 | 131 |
| 7/ 5-7/11 | 44 | 104 | 180 | 137 | 188 | 229 | 121 | 120 |
| 7/12-7/18 | 186 | 137 | 234 | 209 | 230 | 225 | 64 | 154 |
| 7/19-7/25 | 343 | 167 | 300 | 293 | 339 | 385 | 242 | 141 |
| 7/26-8/ 1 | 166 | 95 | 114 | 87 | 146 | 166 | 207 | 97 |
| 8/ 2-8/ 8 | 81 | 75 | 133 | 141 | 204 | 145 | 116 | 125 |
| 8/ 9-8/15 | 104 | 107 | 121 | 92 | 201 | 131 | 75 | 147 |
| 8/16-8/22 | 42 | 36 | 52 | 75 | 78 | 108 | 89 | 60 |
| 8/23-8/29 | 101 | 58 | 104 | 139 | 199 | 140 | 100 | 72 |
| 8/30-9/ 5 | 67 | 90 | 107 | 75 | 125 | 125 | 78 | 102 |
| 9/ 6-9/12 | 95 | 90 | 83 | 98 | 171 | 117 | 73 | 68 |
| 9/13-9/19 | 80 | 122 | 74 | 56 | 110 | 85 | 70 | 87 |
| 5/31-6/27 | 720 | 781 | 701* | 685 | 922 | 816* | 720* | 548 |
| 6/28-7/25 | 832 | 612 | 855 | 819 | 994 | 1079 | 551 | 546 |
| 7/26-8/22 | 393 | 313 | 420 | 395 | 629 | 550 | 487 | 429 |
| 8/23-9/19 | 343 | 360 | 368 | 368 | 605 | 467 | 321 | 329 |
| 12-week total | 1568 | 1285 | 1643 | 1582 | 2228 | 2096 | 1359 | 1304 |
| 16-week total | 2288 | 2066 | 2344* | 2267 | 3150 | 2912* | 2079* | 1852 |

| Date | St. Clairs-ville | San-dusky | St. Williams (Canada) | Tilbury (Canada) | Washing-ton C. H. | Woods-field | Woos-ter |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/31-6/ 6 | 164 | .......... | .......... | .......... | 113 | 163 | ........ |
| 6/ 7-6/13 | 190 | .......... | .......... | .......... | 231 | 205 | ........ |
| 6/14-6/20 | 124 | .......... | .......... | .......... | 82 | 145 | ........ |
| 6/21-6/27 | 149 | .......... | .......... | .......... | 120 | 356 | ........ |
| 6/28-7/ 4 | 162 | 287 | 220 | 247 | 161 | 121 | 237 |
| 7/ 5-7/11 | 138 | 267 | 267 | 231 | 73 | 89 | 235 |
| 7/12-7/18 | 136 | 310 | 230 | 300 | 115 | 130 | 336 |
| 7/19-7/25 | 220 | 319 | 337 | 360 | 245 | 181 | 272 |
| 7/26-8/ 1 | 114 | 200 | 126 | 250 | 117 | 157 | 221 |
| 8/ 2-8/ 8 | 139 | 193 | 163 | 191 | 76 | 135 | 313 |
| 8/ 9-8/15 | 127 | 198 | 116 | 171 | 97 | 210 | 202 |
| 8/16-8/22 | 70 | 200 | 116 | 156 | 33 | 44 | 126 |
| 8/23-8/29 | 121 | 200 | 188 | 164 | 102 | 102 | 146 |
| 8/30-9/ 5 | 83 | 154 | 128 | 130 | 80 | 112 | 161 |
| 9/ 6-9/12 | 112 | 131 | 87 | 108 | 85 | 99 | 161 |
| 9/13-9/19 | 107 | 112 | 75 | 103 | 71 | 90 | 74 |
| 5/31-6/27 | 627 | 812* | 720* | 765* | 546 | 869 | 740* |
| 6/28-7/25 | 656 | 1183 | 1054 | 1138 | 594 | 521 | 1080 |
| 7/26-8/22 | 450 | 791 | 521 | 768 | 323 | 546 | 862 |
| 8/23-9/19 | 423 | 597 | 478 | 505 | 338 | 403 | 542 |
| 12-week total | 1529 | 2571 | 2053 | 2411 | 1255 | 1470 | 2484 |
| 16-week total | 2156 | 3383* | 2773* | 3176* | 1801 | 2339 | 3224* |

*These values calculated.

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

B. From May 30 to September 18, 1927

| Date | Ada | Athens | Caldwell | Carroll | Chillicothe |
|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | |
| 5/30-6/ 5 | ........ | 145 | 200 | 125 | 120 |
| 6/ 6-6/12 | ........ | 150 | 191 | 138 | 150 |
| 6/13-6/19 | ........ | 140 | 141 | 107 | 96 |
| 6/20-6/26 | ........ | 191 | 153 | 160 | 129 |
| 6/27-7/ 3 | 219 | 204 | 176 | 158 | 161 |
| 7/ 4-7/10 | 222 | 208 | 182 | 201 | 174 |
| 7/11-7/17 | 206 | 170 | 159 | 171 | 169 |
| 7/18-7/24 | 171 | 132 | 124 | 171 | 124 |
| 7/25-7/31 | 149 | 119 | 113 | 195 | 126 |
| 8/ 1-8/ 7 | 158 | 106 | 128 | 160 | 109 |
| 8/ 8-8/14 | 163 | 118 | 125 | 178 | 107 |
| 8/15-8/21 | 110 | 116 | 129 | 159 | 84 |
| 8/22-8/28 | 138 | 125 | 140 | 182 | 130 |
| 8/29-9/ 4 | 156 | 121 | 163 | 177 | 94 |
| 9/ 5-9/11 | 136 | 131 | 144 | 191 | 119 |
| 9/12-9/18 | 221 | 144 | 138 | 218 | 180 |
| 5/30-6/26 | 683* | 626 | 685 | 530 | 495 |
| 6/27-7/24 | 818 | 714 | 641 | 701 | 628 |
| 7/25-8/21 | 580 | 459 | 495 | 692 | 426 |
| 8/22-9/18 | 651 | 521 | 585 | 768 | 523 |
| 12-week total | 2049 | 1694 | 1721 | 2161 | 1577 |
| 16-week total | 2732* | 2320 | 2406 | 2691 | 2072 |

| Date | Columbus | Enterprise | Frankfort | London | Marietta | Minerva | Mt. Healthy |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/30-6/ 5 | 178 | 119 | 120 | 150 | 180 | ........ | ........ |
| 6/ 6-6/12 | 201 | 141 | 150 | 190 | 179 | ........ | ........ |
| 6/13-6/19 | 165 | 104 | 86 | 145 | 164 | ........ | ........ |
| 6/20-6/26 | 193 | 158 | 126 | 142 | 162 | ........ | ........ |
| 6/27-7/ 3 | 279 | 155 | 111 | 185 | 185 | 126 | 216 |
| 7/ 4-7/10 | 276 | 158 | 172 | 246 | 186 | 172 | 285 |
| 7/11-7/17 | 253 | 150 | 174 | 243 | 169 | 263 | 225 |
| 7/18-7/24 | 189 | 126 | 164 | 192 | 140 | 211 | 196 |
| 7/25-7/31 | 199 | 122 | 162 | 191 | 106 | 282 | 248 |
| 8/ 1-8/ 7 | 183 | 127 | 125 | 191 | 112 | 265 | 172 |
| 8/ 8-8/14 | 194 | 135 | 139 | 207 | 158 | 217 | 126 |
| 8/15-8/21 | 162 | 116 | 106 | 161 | 106 | 189 | 132 |
| 8/22-8/28 | 182 | 135 | 161 | 182 | 112 | 202 | 140 |
| 8/29-9/ 4 | 156 | 157 | 151 | 209 | 139 | 173 | 154 |
| 9/ 5-9/11 | 180 | 173 | 175 | 183 | 120 | 203 | 161 |
| 9/12-9/18 | 202 | 159 | 207 | 174 | 131 | 196 | 202 |
| 5/30-6/26 | 737 | 522 | 482 | 627 | 685 | 662* | 684* |
| 6/27-7/24 | 997 | 589 | 621 | 866 | 680 | 772 | 922 |
| 7/25-8/21 | 738 | 500 | 532 | 750 | 482 | 953 | 678 |
| 8/22-9/18 | 720 | 624 | 694 | 748 | 502 | 774 | 657 |
| 12-week total | 2455 | 1713 | 1847 | 2364 | 1664 | 2499 | 2257 |
| 16-week total | 3192 | 2235 | 2329 | 2991 | 2349 | 3161* | 2941* |

*These values calculated.

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

| Date | Mt. Vernon | New Concord | Painesville | Proctorville | Russellville | St. Clairsville |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/30–6/ 5 | 130 | 200 | ............ | 128 | 100 | 150 |
| 6/ 6–6/12 | 161 | 192 | ............ | 131 | 155 | 142 |
| 6/13–6/19 | 131 | 178 | ............ | 118 | 98 | 144 |
| 6/20–6/26 | 137 | 203 | ............ | 145 | 120 | 158 |
| 6/27–7/ 3 | 184 | 244 | 260 | 164 | 179 | 195 |
| 7/ 4–7/10 | 192 | 255 | 238 | 225 | 206 | 216 |
| 7/11–7/17 | 160 | 227 | 273 | 196 | 178 | 180 |
| 7/18–7/24 | 148 | 191 | 174 | 174 | 149 | 174 |
| 7/25–7/31 | 177 | 186 | 238 | 141 | 148 | 175 |
| 8/ 1–8/ 7 | 191 | 195 | 260 | 117 | 119 | 143 |
| 8/ 8–8/14 | 177 | 195 | 212 | 118 | 115 | 169 |
| 8/15–8/21 | 105 | 166 | 193 | 107 | 66 | 138 |
| 8/22–8/28 | 159 | 179 | 199 | 115 | 134 | 145 |
| 8/29–9/ 4 | 124 | 197 | 197 | 155 | 128 | 162 |
| 9/ 5–9/11 | 120 | 149 | 167 | 134 | 134 | 167 |
| 9/12–9/18 | 167 | 125 | 189 | 181 | 167 | 162 |
| 5/30–6/26 | 559 | 773 | 870* | 522 | 473 | 594 |
| 6/27–7/24 | 684 | 917 | 945 | 769 | 712 | 765 |
| 7/25–8/21 | 650 | 742 | 903 | 483 | 448 | 625 |
| 8/22–9/18 | 570 | 650 | 752 | 585 | 563 | 636 |
| 12-week total | 1904 | 2309 | 2600 | 1837 | 1723 | 2026 |
| 16-week total | 2463 | 3082 | 3470* | 2359 | 2196 | 2620 |

| Date | Sandusky | Strongsville | Upper Sandusky | Washington C. H. | Woodsfield | Wooster |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/30–6/ 5 | ............ | ............ | ............ | 130 | 200 | 194 |
| 6/ 6–6/12 | ............ | ............ | ............ | 140 | 190 | 204 |
| 6/13–6/19 | ............ | ............ | ............ | 109 | 116 | 172 |
| 6/20–6/26 | ............ | ............ | ............ | 165 | 137 | 169 |
| 6/27–7/ 3 | 217 | 262 | 239 | 202 | 149 | 257 |
| 7/ 4–7/10 | 232 | 298 | 257 | 213 | 174 | 157 |
| 7/11–7/17 | 238 | 279 | 269 | 220 | 172 | 260 |
| 7/18–7/24 | 211 | 237 | 230 | 160 | 136 | 169 |
| 7/25–7/31 | 202 | 239 | 237 | 166 | 144 | 227 |
| 8/ 1–8/ 7 | 182 | 246 | 159 | 171 | 154 | 184 |
| 8/ 8–8/14 | 182 | 254 | 200 | 158 | 126 | 209 |
| 8/15–8/21 | 170 | 241 | 118 | 128 | 101 | 149 |
| 8/22–8/28 | 168 | 239 | 172 | 75 | 153 | 179 |
| 8/29–9/ 4 | 162 | 220 | 138 | 75 | 135 | 163 |
| 9/ 5–9/11 | 155 | 245 | 131 | 98 | 141 | 166 |
| 9/12–9/18 | 154 | 180 | 170 | 130 | 147 | 145 |
| 5/30–6/26 | 758* | 980* | 708* | 544 | 646 | 739 |
| 6/27–7/24 | 898 | 1076 | 995 | 795 | 631 | 843 |
| 7/25–8/21 | 736 | 980 | 714 | 623 | 525 | 769 |
| 8/22–9/18 | 639 | 884 | 611 | 378 | 576 | 653 |
| 12-week total | 2273 | 2940 | 2320 | 1796 | 1732 | 2265 |
| 16-week total | 3031* | 3920* | 3028* | 2340 | 2378 | 3004 |

*These values calculated.

TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued

C. From May 29 to September 17, 1928

| Date | Athens | Belle-fontaine | Bono | Bowling Green | Bryan | Bryan Park |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/29-6/ 4 | 169 | 144 | 165 | 140 | 145 | 196 |
| 6/ 5-6/11 | 99 | 67 | 80 | 76 | 85 | 108 |
| 6/12-6/18 | 192 | 185 | 216 | 207 | 226 | 244 |
| 6/19-6/25 | 102 | 82 | 131 | 100 | 102 | 116 |
| 6/26-7/ 2 | 118 | 92 | 177 | 139 | 128 | 149 |
| 7/ 3-7/ 9 | 128 | 165 | 196 | 135 | 166 | 206 |
| 7/10-7/16 | 139 | 148 | 157 | 139 | 152 | 224 |
| 7/17-7/23 | 128 | 158 | 152 | 135 | 129 | 182 |
| 7/24-7/30 | 170 | 132 | 168 | 149 | 140 | 223 |
| 7/31-8/ 6 | 140 | 174 | 204 | 163 | 129 | 240 |
| 8/ 7-8/13 | 135 | 158 | 183 | 144 | 142 | 250 |
| 8/14-8/20 | 140 | 178 | 156 | 193 | 159 | 229 |
| 8/21-8/27 | 158 | 183 | 190 | 167 | 132 | 267 |
| 8/28-9/ 3 | 158 | 182 | 145 | 146 | 131 | 225 |
| 9/ 4-9/10 | 170 | 187 | 167 | 158 | 131 | 233 |
| 9/11-9/17 | 172 | 214 | 198 | 253 | 200 | 336 |
| 4-week totals | | | | | | |
| 5/29-6/25 | 562 | 478 | 592 | 523 | 558 | 664 |
| 6/26-7/23 | 513 | 563 | 682 | 548 | 575 | 761 |
| 7/24-8/20 | 585 | 642 | 711 | 649 | 570 | 942 |
| 8/21-9/17 | 658 | 766 | 700 | 724 | 594 | 1061 |
| 16-week total | 2318 | 2449 | 2685 | 2444 | 2297 | 3428 |

| Date | Cald-well | Carroll | Castalia | Cleveland | Columbus | Delaware | Elyria |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/29-6/ 4 | 140 | 168 | 153 | 165 | 180 | 150 | 168 |
| 6/ 5-6/11 | 78 | 95 | 81 | 78 | 92 | 82 | 94 |
| 6/12-6/18 | 174 | 207 | 215 | 165 | 252 | 212 | 197 |
| 6/19-6/25 | 78 | 118 | 95 | 166 | 107 | 89 | 96 |
| 6/26-7/ 2 | 115 | 158 | 146 | 152 | 159 | 144 | 133 |
| 7/ 3-7/ 9 | 136 | 167 | 186 | 204 | 214 | 172 | 159 |
| 7/10-7/16 | 105 | 179 | 177 | 156 | 159 | 190 | 144 |
| 7/17-7/23 | 125 | 167 | 258 | 162 | 172 | 134 | 143 |
| 7/24-7/30 | 138 | 170 | 163 | 144 | 181 | 162 | 153 |
| 7/31-8/ 6 | 132 | 169 | 220 | 217 | 180 | 196 | 192 |
| 8/ 7-8/13 | 119 | 160 | 216 | 178 | 113 | 162 | 209 |
| 8/14-8/20 | 117 | 154 | 221 | 197 | 169 | 162 | 214 |
| 8/21-8/27 | 155 | 100 | 206 | 211 | 214 | 208 | 201 |
| 8/28-9/ 3 | 136 | 100 | 220 | 205 | 193 | 196 | 218 |
| 9/ 4-9/10 | 130 | 199 | 196 | 132 | 168 | 168 | 217 |
| 9/11-9/17 | 180 | 215 | 360 | 295 | 236 | 304 | 284 |
| 4-week totals | | | | | | | |
| 5/29-6/25 | 470 | 588 | 544 | 574 | 631 | 543 | 555 |
| 6/26-7/23 | 481 | 671 | 767 | 674 | 704 | 640 | 579 |
| 7/24-8/20 | 506 | 653 | 820 | 736 | 643 | 682 | 768 |
| 8/21-9/17 | 601 | 614 | 982 | 843 | 811 | 876 | 920 |
| 16-week total | 2058 | 2526 | 3113 | 2827 | 2789 | 2741 | 2822 |

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

| Date | Enterprise | Frankfort | Ironton | Lafayette | Marietta | Mt. Vernon | New Concord |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/29–6/ 4 | 151 | 141 | 170 | 166 | 171 | 198 | 182 |
| 6/ 5–6/11 | 82 | 141 | 112 | 82 | 97 | 80 | 137 |
| 6/12–6/18 | 188 | 137 | 174 | 230 | 189 | 229 | 230 |
| 6/19–6/25 | 119 | 124 | 141 | 109 | 94 | 110 | 138 |
| 6/26–7/ 2 | 138 | 117 | 111 | 107 | 126 | 163 | 178 |
| 7/ 3–7/ 9 | 149 | 117 | 161 | 170 | 166 | 170 | 188 |
| 7/10–7/16 | 165 | 120 | 124 | 156 | 127 | 171 | 191 |
| 7/17–7/23 | 157 | 127 | 149 | 138 | 151 | 154 | 150 |
| 7/24–7/30 | 153 | 147 | 169 | 131 | 157 | 205 | 187 |
| 7/31–8/ 6 | 148 | 147 | 114 | 155 | 131 | 228 | 175 |
| 8/ 7–8/13 | 134 | 156 | 123 | 138 | 133 | 195 | 164 |
| 8/14–8/20 | 127 | 156 | 83 | 151 | 133 | 182 | 141 |
| 8/21–8/27 | 165 | 197 | 136 | 166 | 150 | 215 | 208 |
| 8/28–9/ 3 | 165 | 197 | 101 | 187 | 166 | 197 | 186 |
| 9/ 4–9/10 | 186 | 197 | 115 | 146 | 120 | 211 | 176 |
| 9/11–9/17 | 189 | 197 | 165 | 228 | 170 | 344 | 225 |
| 4-week totals | | | | | | | |
| 5/29–6/25 | 540 | 543 | 597 | 587 | 551 | 617 | 687 |
| 6/26–7/23 | 609 | 481 | 545 | 571 | 570 | 658 | 707 |
| 7/24–8/20 | 562 | 606 | 489 | 575 | 554 | 810 | 667 |
| 8/21–9/17 | 705 | 788 | 517 | 727 | 606 | 967 | 795 |
| 16-week total | 2416 | 2418 | 2148 | 2460 | 2281 | 3052 | 2856 |

| Date | Oak Harbor | Painesville | Proctorville | Ravenna | St. Clairsville | Sandusky | Shawnee |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/29–6/ 4 | 114 | 155 | 151 | 201 | 119 | 172 | 170 |
| 6/ 5–6/11 | 81 | 80 | 102 | 83 | 72 | 91 | 70 |
| 6/12–6/18 | 208 | 206 | 151 | 242 | 174 | 213 | 147 |
| 6/19–6/25 | 85 | 89 | 131 | 133 | 104 | 91 | 91 |
| 6/26–7/ 2 | 145 | 158 | 110 | 143 | 148 | 151 | 74 |
| 7/ 3–7/ 9 | 190 | 152 | 144 | 208 | 145 | 175 | 110 |
| 7/10–7/16 | 159 | 145 | 107 | 99 | 128 | 152 | 72 |
| 7/17–7/23 | 164 | 127 | 126 | 170 | 104 | 238 | 86 |
| 7/24–7/30 | 111 | 102 | 116 | 144 | 122 | 126 | 105 |
| 7/31–8/ 6 | 169 | 188 | 95 | 213 | 131 | 171 | 75 |
| 8/ 7–8/13 | 142 | 139 | 99 | 188 | 166 | 168 | 80 |
| 8/14–8/20 | 163 | 168 | 63 | 194 | 169 | 138 | 57 |
| 8/21–8/27 | 143 | 153 | 96 | 175 | 163 | 211 | 87 |
| 8/28–9/ 3 | 199 | 185 | 123 | 180 | 178 | 197 | 108 |
| 9/ 4–9/10 | 160 | 128 | 58 | 164 | 188 | 147 | 119 |
| 9/11–9/17 | 294 | 259 | 145 | 290 | 157 | 300 | 159 |
| 4-week totals | | | | | | | |
| 5/29–6/25 | 488 | 530 | 535 | 659 | 469 | 567 | 478 |
| 6/26–7/23 | 658 | 582 | 487 | 620 | 525 | 716 | 342 |
| 7/24–8/20 | 585 | 597 | 373 | 739 | 588 | 603 | 317 |
| 8/21–9/17 | 796 | 725 | 422 | 809 | 686 | 855 | 473 |
| 16-week total | 2527 | 2434 | 1817 | 2827 | 2268 | 2741 | 1610 |

TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued

| Date | Toledo | Washington C. H. | Waterloo | Wauseon | Willard | Woodsfield | Wooster |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/29–6/ 4 | 140 | 162 | 102 | 142 | 161 | 149 | 174 |
| 6/ 5–6/11 | 68 | 98 | 50 | 84 | 117 | 80 | 97 |
| 6/12–6/18 | 250 | 201 | 119 | 194 | 216 | 164 | 210 |
| 6/19–6/25 | 113 | 130 | 47 | 106 | 133 | 71 | 114 |
| 6/26–7/ 2 | 137 | 120 | 104 | 98 | 137 | 176 | 165 |
| 7/ 3–7/ 9 | 216 | 182 | 136 | 187 | 178 | 111 | 198 |
| 7/10–7/16 | 164 | 176 | 98 | 166 | 180 | 91 | 185 |
| 7/17–7/23 | 184 | 153 | 116 | 166 | 156 | 106 | 203 |
| 7/24–7/30 | 162 | 165 | 163 | 136 | 160 | 159 | 175 |
| 7/31–8/ 6 | 206 | 162 | 188 | 207 | 213 | 139 | 175 |
| 8/ 7–8/13 | 182 | 157 | 140 | 167 | 205 | 113 | 174 |
| 8/14–8/20 | 195 | 151 | 98 | 178 | 211 | 105 | 181 |
| 8/21–8/27 | 204 | 175 | 124 | 131 | 184 | 134 | 217 |
| 8/28–9/ 3 | 212 | 167 | 116 | 176 | 189 | 124 | 179 |
| 9/ 4–9/10 | 166 | 118 | 158 | 194 | 152 | 143 | 197 |
| 9/11–9/17 | 235 | 257 | 134 | 225 | 219 | 142 | 294 |
| 4-week totals | | | | | | | |
| 5/29–6/25 | 571 | 591 | 318 | 526 | 627 | 464 | 595 |
| 6/26–7/23 | 701 | 631 | 454 | 617 | 651 | 484 | 751 |
| 7/24–8/20 | 745 | 635 | 589 | 688 | 789 | 516 | 705 |
| 8/21–9/17 | 817 | 717 | 532 | 726 | 744 | 543 | 887 |
| 16-week total | 2834 | 2574 | 1893 | 2557 | 2811 | 2007 | 2938 |

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

D. From May 27 to September 15, 1929

| Date | Ada | Athens | Bryan | Bryan Park | Canfield | Carroll |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/27-6/ 2 | 129 | 197 | 149 | 173 | 169 | 179 |
| 6/ 3-6/ 9 | 148 | 192 | 176 | 193 | 182 | 178 |
| 6/10-6/16 | 105 | 203 | 142 | 158 | 214 | 156 |
| 6/17-6/23 | 122 | 231 | 187 | 184 | 233 | 178 |
| 6/24-6/30 | 149 | 174 | 239 | 192 | 194 | 117 |
| 7/ 1-7/ 7 | 113 | 150 | 169 | 173 | 100 | 184 |
| 7/ 8-7/14 | 114 | 183 | 123 | 140 | 188 | 194 |
| 7/15-7/21 | 128 | 226 | 206 | 215 | 199 | 205 |
| 7/22-7/28 | 150 | 189 | 142 | 221 | 126 | 239 |
| 7/29-8/ 4 | 209 | 154 | 175 | 237 | 219 | 248 |
| 8/ 5-8/11 | 120 | 118 | 139 | 177 | 262 | 178 |
| 8/12-8/18 | 159 | 179 | 199 | 190 | 189 | 211 |
| 8/19-8/25 | 151 | 125 | 172 | 218 | 207 | 179 |
| 8/26-9/ 1 | 138 | 122 | 142 | 210 | 223 | 159 |
| 9/ 2-9/ 8 | 132 | 121 | 168 | 175 | 232 | 145 |
| 9/ 9-9/15 | 130 | 122 | 142 | 141 | 163 | 144 |
| 4-week totals | | | | | | |
| 5/27-6/23 | 504 | 823 | 654 | 708 | 798 | 691 |
| 6/24-7/21 | 504 | 733 | 737 | 720 | 681 | 700 |
| 7/22-8/18 | 638 | 640 | 655 | 825 | 796 | 876 |
| 8/19-9/15 | 551 | 490 | 624 | 744 | 825 | 627 |
| 16-week total | 2197 | 2686 | 2670 | 2997 | 3100 | 2894 |

| Date | Columbus | Cortland | Delaware | Enterprise | Holgate | Marietta | McGuffey |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/27-6/ 2 | 301 | 197 | 169 | 179 | 250 | 212 | 185 |
| 6/ 3-6/ 9 | 227 | 218 | 170 | 189 | 257 | 201 | 140 |
| 6/10-6/16 | 232 | 183 | 170 | 183 | 159 | 209 | 220 |
| 6/17-6/23 | 271 | 218 | 166 | 181 | 246 | 196 | 134 |
| 6/24-6/30 | 233 | 155 | 144 | 199 | 202 | 195 | 147 |
| 7/ 1-7/ 7 | 226 | 240 | 162 | 184 | 202 | 185 | 199 |
| 7/ 8-7/14 | 207 | 174 | 134 | 204 | 183 | 132 | 207 |
| 7/15-7/21 | 287 | 158 | 213 | 228 | 274 | 234 | 131 |
| 7/22-7/28 | 287 | 244 | 185 | 208 | 207 | 202 | 245 |
| 7/29-8/ 4 | 248 | 215 | 176 | 167 | 268 | 219 | 256 |
| 8/ 5-8/11 | 205 | 227 | 144 | 135 | 189 | 168 | 216 |
| 8/12-8/18 | 227 | 145 | 172 | 190 | 131 | 219 | 185 |
| 8/19-8/25 | 209 | 225 | 176 | 147 | 250 | 221 | 184 |
| 8/26-9/ 1 | 211 | 134 | 142 | 147 | 118 | 230 | 166 |
| 9/ 2-9/ 8 | 184 | 243 | 152 | 147 | 188 | 113 | 161 |
| 9/ 9-9/15 | 176 | 242 | 134 | 147 | 101 | 144 | 205 |
| 4-week totals | | | | | | | |
| 5/27-6/23 | 1031 | 816 | 675 | 732 | 912 | 818 | 679 |
| 6/24-7/21 | 953 | 727 | 653 | 815 | 861 | 746 | 684 |
| 7/22-8/18 | 967 | 831 | 677 | 700 | 795 | 808 | 902 |
| 8/19-9/15 | 780 | 844 | 604 | 588 | 657 | 708 | 716 |
| 16-week total | 3731 | 3218 | 2609 | 2835 | 3225 | 3080 | 2981 |

TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued

| Date | New Concord | Oak Harbor | Paulding | Ravenna | Russellville | St. Clairsville | Shawnee |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/27-6/ 2 | 246 | 215 | 225 | 217 | 123 | 177 | 188 |
| 6/ 3-6/ 9 | 167 | 194 | 268 | 271 | 121 | 166 | 146 |
| 6/10-6/16 | 168 | 160 | 130 | 253 | 112 | 209 | 99 |
| 6/17-6/23 | 170 | 207 | 185 | 238 | 130 | 180 | 123 |
| 6/24-6/30 | 158 | 175 | 245 | 199 | 119 | 167 | 115 |
| 7/ 1-7/ 7 | 162 | 176 | 163 | 246 | 122 | 152 | 110 |
| 7/ 8-7/14 | 119 | 155 | 208 | 149 | 96 | 156 | 112 |
| 7/15-7/21 | 174 | 218 | 296 | 272 | 156 | 175 | 190 |
| 7/22-7/28 | 139 | 163 | 325 | 217 | 153 | 219 | 172 |
| 7/29-8/ 4 | 159 | 193 | 159 | 247 | 139 | 229 | 134 |
| 8/ 5-8/11 | 156 | 155 | 185 | 275 | 117 | 165 | 142 |
| 8/12-8/18 | 154 | 157 | 282 | 264 | 184 | 164 | 145 |
| 8/19-8/25 | 139 | 169 | 189 | 255 | 168 | 175 | 130 |
| 8/26-9/ 1 | 129 | 174 | 238 | 238 | 164 | 173 | 152 |
| 9/ 2-9/ 8 | 117 | 149 | 180 | 164 | 134 | 178 | 122 |
| 9/ 9-9/15 | 115 | 144 | 189 | 200 | 114 | 159 | 119 |
| 4-week totals | | | | | | | |
| 5/27-6/23 | 751 | 776 | 808 | 979 | 486 | 732 | 556 |
| 6/24-7/21 | 613 | 724 | 912 | 866 | 493 | 650 | 527 |
| 7/22-8/18 | 608 | 668 | 951 | 1003 | 593 | 777 | 593 |
| 8/19-9/15 | 500 | 636 | 796 | 857 | 580 | 685 | 523 |
| 16-week total | 2472 | 2804 | 3467 | 3705 | 2152 | 2844 | 2199 |

| Date | Strongsville | Waterloo | Wauseon | Willard | Woodsfield | Wooster |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/27-6/ 2 | 188 | 146 | 187 | 205 | 206 | 248 |
| 6/ 3-6/ 9 | 207 | 122 | 179 | 210 | 206 | 210 |
| 6/10-6/16 | 254 | 126 | 155 | 224 | 212 | 248 |
| 6/17-6/23 | 204 | 157 | 211 | 215 | 200 | 199 |
| 6/24-6/30 | 184 | 110 | 189 | 180 | 174 | 180 |
| 7/ 1-7/ 7 | 214 | 122 | 210 | 214 | 268 | 200 |
| 7/ 8-7/14 | 167 | 88 | 198 | 210 | 224 | 143 |
| 7/15-7/21 | 239 | 164 | 331 | 180 | 305 | 207 |
| 7/22-7/28 | 231 | 146 | 216 | 150 | 200 | 200 |
| 7/29-8/ 4 | 213 | 102 | 197 | 167 | 221 | 187 |
| 8/ 5-8/11 | 255 | 86 | 196 | 183 | 208 | 162 |
| 8/12-8/18 | 241 | 168 | 201 | 167 | 206 | 180 |
| 8/19-8/25 | 239 | 78 | 232 | 207 | 183 | 171 |
| 8/26-9/ 1 | 222 | 103 | 218 | 222 | 161 | 203 |
| 9/ 2-9/ 8 | 250 | 42 | 205 | 167 | 154 | 178 |
| 9/ 9-9/15 | 222 | 116 | 158 | 159 | 138 | 162 |
| 4-week totals | | | | | | |
| 5/27-6/23 | 853 | 551 | 732 | 854 | 824 | 905 |
| 6/24-7/21 | 804 | 484 | 928 | 784 | 971 | 730 |
| 7/22-8/18 | 940 | 502 | 910 | 667 | 835 | 729 |
| 8/19-9/15 | 933 | 339 | 813 | 755 | 636 | 714 |
| 16-week total | 3530 | 1876 | 3283 | 3060 | 3266 | 3078 |

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

E. From May 26 to September 14, 1930

| Date | Ada | Athens | Bladensburg | Bryan | Bryan Park |
|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | |
| 5/26-6/ 1 | 205 | 282 | 192 | 203 | 255 |
| 6/ 2-6/ 8 | 311 | 392 | 274 | 227 | 340 |
| 6/ 9-6/15 | 323 | 411 | 337 | 276 | 346 |
| 6/16-6/22 | 241 | 253 | 137 | 252 | 259 |
| 6/23-6/29 | 313 | 399 | 258 | 347 | 316 |
| 6/30-7/ 6 | 335 | 475 | 256 | 303 | 326 |
| 7/ 7-7/13 | 365 | 270 | 341 | 393 | 403 |
| 7/14-7/20 | 554 | 523 | 485 | 441 | 439 |
| 7/21-7/27 | 469 | 472 | 332 | 373 | 335 |
| 7/28-8/ 3 | 462 | 444 | 299 | 439 | 341 |
| 8/ 4-8/10 | 232 | 196 | 328 | 299 | 424 |
| 8/11-8/17 | 279 | 225 | 317 | 230 | 314 |
| 8/18-8/24 | 183 | 180 | 149 | 209 | 216 |
| 8/25-8/31 | 236 | 198 | 218 | 260 | 212 |
| 9/ 1-9/ 7 | 193 | 155 | 173 | 223 | 185 |
| 9/ 8-9/14 | 234 | 158 | 177 | 239 | 175 |
| 4-week totals | | | | | |
| 5/26-6/22 | 1080 | 1338 | 940 | 958 | 1200 |
| 6/23-7/20 | 1567 | 1667 | 1340 | 1484 | 1484 |
| 7/21-8/17 | 1442 | 1337 | 1276 | 1341 | 1414 |
| 8/18-9/14 | 846 | 691 | 717 | 931 | 788 |
| 16-week total | 4935 | 5033 | 4273 | 4714 | 4886 |

| Date | Canfield | Carpenter | Carroll | Chilli-cothe | Cleve-land | Columbus | Cortland |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/26-6/ 1 | 306 | 295 | 296 | 223 | 199 | 311 | 232 |
| 6/ 2-6/ 8 | 370 | 279 | 365 | 253 | 349 | 361 | 321 |
| 6/ 9-6/15 | 237 | 283 | 392 | 255 | 341 | 321 | 277 |
| 6/16-6/22 | 259 | 290 | 214 | 231 | 199 | 210 | 208 |
| 6/23-6/29 | 225 | 244 | 487 | 245 | 290 | 474 | 282 |
| 6/30-7/ 6 | 273 | 251 | 546 | 333 | 278 | 422 | 209 |
| 7/ 7-7/13 | 333 | 298 | 281 | 325 | 344 | 299 | 248 |
| 7/14-7/20 | 428 | 350 | 576 | 389 | 413 | 459 | 376 |
| 7/21-7/27 | 404 | 340 | 556 | 349 | 349 | 417 | 283 |
| 7/28-8/ 3 | 354 | 327 | 515 | 457 | 526 | 504 | 488 |
| 8/ 4-8/10 | 372 | 216 | 251 | 297 | 418 | 282 | 352 |
| 8/11-8/17 | 256 | 186 | 264 | 242 | 207 | 267 | 282 |
| 8/18-8/24 | 170 | 118 | 273 | 189 | 167 | 222 | 94 |
| 8/25-8/31 | 208 | 135 | 235 | 277 | 212 | 220 | 203 |
| 9/ 1-9/ 7 | 194 | 177 | 207 | 246 | 269 | 242 | 248 |
| 9/ 8-9/14 | 230 | 145 | 286 | 134 | 278 | 183 | 195 |
| 4-week totals | | | | | | | |
| 5/26-6/22 | 1172 | 1147 | 1267 | 962 | 1088 | 1203 | 1038 |
| 6/23-7/20 | 1259 | 1143 | 1890 | 1292 | 1325 | 1654 | 1115 |
| 7/21-8/17 | 1386 | 1069 | 1586 | 1345 | 1500 | 1470 | 1405 |
| 8/18-9/14 | 802 | 575 | 1001 | 846 | 926 | 867 | 740 |
| 16-week total | 4619 | 3934 | 5744 | 4445 | 4839 | 5194 | 4298 |

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

| Date | Delaware | Enterprise | Findlay | Gallipolis | Germantown | Hillsboro |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/26–6/ 1 | 171 | 235 | 234 | 287 | 283 | 230 |
| 6/ 2–6/ 8 | 316 | 294 | 388 | 292 | 359 | 277 |
| 6/ 9–6/15 | 344 | 404 | 389 | 257 | 407 | 272 |
| 6/16–6/22 | 145 | 214 | 244 | 211 | 280 | 171 |
| 6/23–6/29 | 257 | 373 | 369 | 249 | 415 | 297 |
| 6/30–7/ 6 | 302 | 343 | 274 | 233 | 476 | 289 |
| 7/ 7–7/13 | 332 | 214 | 397 | 320 | 495 | 311 |
| 7/14–7/20 | 425 | 450 | 477 | 343 | 512 | 364 |
| 7/21–7/27 | 296 | 468 | 325 | 357 | 434 | 284 |
| 7/28–8/ 3 | 378 | 439 | 458 | 349 | 506 | 387 |
| 8/ 4–8/10 | 261 | 411 | 287 | 231 | 336 | 291 |
| 8/11–8/17 | 258 | 255 | 243 | 192 | 295 | 267 |
| 8/18–8/24 | 201 | 229 | 182 | 108 | 226 | 193 |
| 8/25–8/31 | 187 | 225 | 194 | 160 | 226 | 213 |
| 9/ 1–9/ 7 | 186 | 271 | 216 | 230 | 191 | 197 |
| 9/ 8–9/14 | 183 | 194 | 196 | 134 | 174 | 141 |
| 4-week totals | | | | | | |
| 5/26–6/22 | 976 | 1147 | 1255 | 1047 | 1329 | 950 |
| 6/23–7/20 | 1316 | 1380 | 1517 | 1145 | 1898 | 1261 |
| 7/21–8/17 | 1193 | 1573 | 1313 | 1129 | 1571 | 1229 |
| 8/18–9/14 | 757 | 919 | 788 | 632 | 817 | 744 |
| 16-week total | 4242 | 5019 | 4873 | 3953 | 5615 | 4184 |

| Date | Holgate | London | Marietta | Mendon | Mt. Healthy | New Concord | Oak Harbor | Owensville |
|---|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | | |
| 5/26–6/ 1 | 291 | 303 | 241 | 228 | 302 | 256 | 106 | 298 |
| 6/ 2–6/ 8 | 217 | 224 | 306 | 320 | 347 | 216 | 238 | 352 |
| 6/ 9–6/15 | 217 | 369 | 328 | 296 | 359 | 455 | 245 | 383 |
| 6/16–6/22 | 325 | 258 | 244 | 212 | 239 | 200 | 184 | 284 |
| 6/23–6/29 | 202 | 287 | 312 | 315 | 466 | 230 | 395 | 477 |
| 6/30–7/ 6 | 240 | 371 | 225 | 303 | 416 | 231 | 356 | 434 |
| 7/ 7–7/13 | 333 | 456 | 420 | 416 | 425 | 256 | 444 | 449 |
| 7/14–7/20 | 506 | 439 | 369 | 416 | 477 | 327 | 594 | 514 |
| 7/21–7/27 | 402 | 387 | 390 | 388 | 350 | 302 | 314 | 497 |
| 7/28–8/ 3 | 393 | 364 | 362 | 453 | 439 | 404 | 431 | 492 |
| 8/ 4–8/10 | 261 | 306 | 270 | 214 | 290 | 287 | 332 | 426 |
| 8/11–8/17 | 202 | 295 | 274 | 162 | 290 | 408 | 285 | 327 |
| 8/18–8/24 | 228 | 272 | 192 | 181 | 226 | 265 | 199 | 235 |
| 8/25–8/31 | 179 | 283 | 231 | 154 | 325 | 124 | 270 | 332 |
| 9/ 1–9/ 7 | 254 | 254 | 199 | 191 | 234 | 295 | 270 | 267 |
| 9/ 8–9/14 | 193 | 175 | 192 | 200 | 138 | 119 | 248 | 225 |
| 4-week totals | | | | | | | | |
| 5/26–6/22 | 1050 | 1154 | 1119 | 1056 | 1247 | 1127 | 773 | 1317 |
| 6/23–7/20 | 1281 | 1553 | 1326 | 1450 | 1784 | 1044 | 1789 | 1874 |
| 7/21–8/17 | 1258 | 1352 | 1296 | 1217 | 1369 | 1401 | 1362 | 1742 |
| 8/18–9/14 | 854 | 984 | 814 | 726 | 923 | 803 | 987 | 1059 |
| 16-week total | 4443 | 5043 | 4555 | 4449 | 5323 | 4375 | 4911 | 5992 |

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

| Date | Paulding | Ravenna | St. Clairsville | Shawnee | Strongsville | Troy | Unionville |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 5/26–6/ 1 | 270 | 186 | 196 | 220 | 168 | 229 | 154 |
| 6/ 2–6/ 8 | 306 | 362 | 206 | 146 | 399 | 199 | 271 |
| 6/ 9–6/15 | 232 | 327 | 222 | 146 | 422 | 322 | 223 |
| 6/16–6/22 | 153 | 214 | 350 | 215 | 186 | 240 | 118 |
| 6/23–6/29 | 332 | 278 | 397 | 274 | 310 | 327 | 230 |
| 6/30–7/ 6 | 314 | 274 | 369 | 355 | 296 | 218 | 172 |
| 7/ 7–7/13 | 351 | 321 | 456 | 289 | 351 | 345 | 245 |
| 7/14–7/20 | 637 | 325 | 391 | 396 | 471 | 399 | 329 |
| 7/21–7/27 | 350 | 355 | 332 | 285 | 340 | 374 | 254 |
| 7/28–8/ 3 | 616 | 315 | 402 | 230 | 560 | 359 | 373 |
| 8/ 4–8/10 | 236 | 319 | 247 | 197 | 356 | 212 | 298 |
| 8/11–8/17 | 321 | 181 | 213 | 419 | 257 | 202 | 222 |
| 8/18–8/24 | 266 | 157 | 240 | 162 | 183 | 185 | 143 |
| 8/25–8/31 | 206 | 160 | 236 | 332 | 258 | 184 | 125 |
| 9/ 1–9/ 7 | 248 | 200 | 202 | 392 | 249 | 157 | 170 |
| 9/ 8–9/14 | 266 | 204 | 188 | 126 | 295 | 179 | 181 |
| 4-week totals | | | | | | | |
| 5/26–6/22 | 961 | 1089 | 974 | 727 | 1175 | 990 | 766 |
| 6/23–7/20 | 1634 | 1198 | 1613 | 1314 | 1428 | 1289 | 976 |
| 7/21–8/17 | 1523 | 1170 | 1194 | 1131 | 1513 | 1147 | 1147 |
| 8/18–9/14 | 986 | 721 | 866 | 1012 | 985 | 705 | 619 |
| 16-week total | 5104 | 4178 | 4647 | 4184 | 5101 | 4131 | 3508 |

| Date | Venice | Waterloo | Wauseon | Willard | Woodsfield | Wooster |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 5/26–6/ 1 | 167 | 220 | 213 | 222 | 228 | 164 |
| 6/ 2–6/ 8 | 239 | 234 | 369 | 295 | 367 | 348 |
| 6/ 9–6/15 | 219 | 219 | 285 | 350 | 305 | 388 |
| 6/16–6/22 | 173 | 121 | 189 | 219 | 267 | 191 |
| 6/23–6/29 | 282 | 184 | 318 | 209 | 362 | 245 |
| 6/30–7/ 6 | 284 | 184 | 299 | 278 | 329 | 247 |
| 7/ 7–7/13 | 358 | 272 | 395 | 292 | 348 | 322 |
| 7/14–7/20 | 350 | 269 | 506 | 259 | 366 | 428 |
| 7/21–7/27 | 324 | 267 | 391 | 261 | 527 | 352 |
| 7/28–8/ 3 | 477 | 287 | 475 | 394 | 465 | 398 |
| 8/ 4–8/10 | 348 | 279 | 360 | 288 | 459 | 373 |
| 8/11–8/17 | 241 | 312 | 310 | 218 | 346 | 303 |
| 8/18–8/24 | 222 | 282 | 251 | 182 | 237 | 199 |
| 8/25–8/31 | 240 | 277 | 254 | 174 | 237 | 199 |
| 9/ 1–9/ 7 | 242 | 318 | 227 | 193 | 300 | 243 |
| 9/ 8–9/14 | 249 | 238 | 285 | 176 | 341 | 248 |
| 4-week totals | | | | | | |
| 5/26–6/22 | 798 | 794 | 1056 | 1086 | 1167 | 1091 |
| 6/23–7/20 | 1274 | 909 | 1518 | 1038 | 1405 | 1242 |
| 7/21–8/17 | 1390 | 1145 | 1536 | 1161 | 1797 | 1426 |
| 8/18–9/14 | 953 | 1115 | 1017 | 725 | 1115 | 889 |
| 16-week total | 4415 | 3963 | 5127 | 4010 | 5484 | 4648 |

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

F. From June 1 to September 20, 1931

| Date | Ada | Athens | Bladensburg | Bowling Green | Bryan |
|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | |
| 6/ 1-6/ 7 | 167 | 188 | 146 | 352 | 146 |
| 6/ 8-6/14 | 204 | 183 | 142 | 225 | 182 |
| 6/15-6/21 | 234 | 207 | 191 | 323 | 233 |
| 6/22-6/28 | 174 | 163 | 198 | 218 | 223 |
| 6/29-7/ 5 | 190 | 234 | 172 | 218 | 167 |
| 7/ 6-7/12 | 248 | 280 | 235 | 339 | 214 |
| 7/13-7/19 | 248 | 253 | 264 | 230 | 214 |
| 7/20-7/26 | 227 | 152 | 177 | 259 | 172 |
| 7/27-8/ 2 | 296 | 222 | 246 | 306 | 289 |
| 8/ 3-8/ 9 | 191 | 181 | 203 | 316 | 217 |
| 8/10-8/16 | 196 | 164 | 109 | 205 | 165 |
| 8/17-8/23 | 179 | 103 | 150 | 215 | 199 |
| 8/24-8/30 | 166 | 200 | 150 | 232 | 140 |
| 8/31-9/ 6 | 178 | 269 | 195 | 135 | 145 |
| 9/ 7-9/13 | 179 | 199 | 176 | 221 | 214 |
| 9/14-9/20 | 174 | 122 | 176 | 232 | 112 |
| 4-week totals | | | | | |
| 6/ 1-6/28 | 779 | 741 | 677 | 1118 | 784 |
| 6/29-7/26 | 913 | 919 | 848 | 1046 | 767 |
| 7/27-8/23 | 862 | 670 | 708 | 1042 | 870 |
| 8/24-9/20 | 697 | 790 | 697 | 820 | 611 |
| 16-week total | 3251 | 3120 | 2930 | 4026 | 3032 |

| Date | Bryan Park | Canfield | Carpenter | Carroll | Chesapeake | Cleveland | Columbus |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 6/ 1-6/ 7 | 192 | 440 | 146 | 177 | 236 | 207 | 237 |
| 6/ 8-6/14 | 200 | 193 | 119 | 160 | 198 | 207 | 243 |
| 6/15-6/21 | 263 | 243 | 178 | 225 | 257 | 304 | 304 |
| 6/22-6/28 | 192 | 140 | 125 | 192 | 192 | 143 | 280 |
| 6/29-7/ 5 | 191 | 215 | 156 | 215 | 191 | 274 | 302 |
| 7/ 6-7/12 | 284 | 197 | 167 | 277 | 244 | 249 | 383 |
| 7/13-7/19 | 263 | 227 | 175 | 282 | 259 | 247 | 322 |
| 7/20-7/26 | 180 | 257 | 97 | 180 | 157 | 258 | 229 |
| 7/27-8/ 2 | 255 | 257 | 181 | 235 | 246 | 240 | 301 |
| 8/ 3-8/ 9 | 181 | 226 | 125 | 166 | 149 | 276 | 212 |
| 8/10-8/16 | 177 | 154 | 101 | 138 | 116 | 180 | 126 |
| 8/17-8/23 | 116 | 154 | 72 | 119 | 84 | 211 | 140 |
| 8/24-8/30 | 130 | 206 | 132 | 183 | 202 | 150 | 176 |
| 8/31-9/ 6 | 152 | 219 | 131 | 170 | 245 | 145 | 178 |
| 9/ 7-9/13 | 197 | 183 | 153 | 190 | 264 | 241 | 220 |
| 9/14-9/20 | 185 | 183 | 144 | 214 | 245 | 214 | 216 |
| 4-week totals | | | | | | | |
| 6/ 1-6/28 | 847 | 1016 | 568 | 754 | 883 | 861 | 1064 |
| 6/29-7/26 | 918 | 896 | 595 | 954 | 851 | 1028 | 1236 |
| 7/27-8/23 | 729 | 791 | 479 | 658 | 595 | 907 | 779 |
| 8/24-9/20 | 664 | 791 | 560 | 757 | 956 | 750 | 790 |
| 16-week total | 3158 | 3494 | 2202 | 3123 | 3285 | 3546 | 3869 |

**TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Continued**

| Date | Cortland | Delaware | Enterprise | Findlay | Gallipolis | Germantown |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 6/ 1–6/ 7 | 154 | 179 | 182 | 145 | 174 | 248 |
| 6/ 8–6/14 | 279 | 178 | 172 | 180 | 132 | 221 |
| 6/15–6/21 | 219 | 259 | 207 | 214 | 187 | 287 |
| 6/22–6/28 | 170 | 165 | 153 | 153 | 182 | 206 |
| 6/29–7/ 5 | 178 | 205 | 189 | 197 | 227 | 206 |
| 7/ 6–7/12 | 197 | 237 | 216 | 261 | 211 | 333 |
| 7/13–7/19 | 142 | 254 | 193 | 232 | 172 | 228 |
| 7/20–7/26 | 142 | 172 | 134 | 268 | 115 | 270 |
| 7/27–8/ 2 | 286 | 251 | 177 | 321 | 154 | 337 |
| 8/ 3–8/ 9 | 193 | 186 | 143 | 247 | 155 | 223 |
| 8/10–8/16 | 152 | 135 | 129 | 163 | 101 | 123 |
| 8/17–8/23 | 202 | 199 | 97 | 225 | 61 | 153 |
| 8/24–8/30 | 244 | 139 | 158 | 163 | 126 | 164 |
| 8/31–9/ 6 | 142 | 125 | 161 | 119 | 109 | 213 |
| 9/ 7–9/13 | 247 | 164 | 179 | 176 | 148 | 191 |
| 9/14–9/20 | 246 | 167 | 194 | 189 | 148 | 248 |
| 4-week totals | | | | | | |
| 6/ 1–6/28 | 822 | 781 | 714 | 692 | 675 | 962 |
| 6/29–7/26 | 659 | 868 | 732 | 958 | 725 | 1037 |
| 7/27–8/23 | 833 | 771 | 546 | 956 | 471 | 836 |
| 8/24–9/20 | 879 | 595 | 692 | 647 | 531 | 816 |
| 16-week total | 3193 | 3015 | 2684 | 3253 | 2402 | 3651 |

| Date | Hillsboro | Holgate | London | Marietta | Mt. Healthy | New Concord | Oak Harbor |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 6/ 1–6/ 7 | 147 | 158 | 197 | 178 | 265 | 146 | 146 |
| 6/ 8–6/14 | 200 | 249 | 214 | 221 | 257 | 186 | 184 |
| 6/15–6/21 | 165 | 261 | 305 | 283 | 310 | 193 | 299 |
| 6/22–6/28 | 145 | 190 | 347 | 217 | 310 | 172 | 193 |
| 6/29–7/ 5 | 208 | 208 | 388 | 281 | 281 | 217 | 228 |
| 7/ 6–7/12 | 198 | 251 | 372 | 294 | 332 | 268 | 239 |
| 7/13–7/19 | 132 | 215 | 390 | 276 | 326 | 168 | 204 |
| 7/20–7/26 | 134 | 210 | 300 | 197 | 226 | 148 | 228 |
| 7/27–8/ 2 | 123 | 332 | 372 | 262 | 286 | 187 | 329 |
| 8/ 3–8/ 9 | 102 | 236 | 203 | 173 | 200 | 179 | 254 |
| 8/10–8/16 | 96 | 158 | 131 | 175 | 135 | 123 | 160 |
| 8/17–8/23 | 130 | 178 | 133 | 110 | 137 | 93 | 220 |
| 8/24–8/30 | 140 | 208 | 132 | 159 | 181 | 82 | 220 |
| 8/31–9/ 6 | 137 | 134 | 126 | 190 | 153 | 96 | 135 |
| 9/ 7–9/13 | 153 | 213 | 241 | 171 | 199 | 108 | 235 |
| 9/14–9/20 | 137 | 204 | 224 | 184 | 215 | 197 | 149 |
| 4-week totals | | | | | | | |
| 6/ 1–6/28 | 657 | 858 | 1063 | 899 | 1142 | 697 | 822 |
| 6/29–7/26 | 672 | 884 | 1450 | 1048 | 1165 | 801 | 899 |
| 7/27–8/23 | 451 | 904 | 839 | 720 | 758 | 582 | 963 |
| 8/24–9/20 | 567 | 759 | 723 | 704 | 748 | 483 | 739 |
| 16-week total | 2347 | 3405 | 4075 | 3371 | 3813 | 2563 | 3423 |

TABLE 3.—Average, Corrected Weekly Evaporation Values, Stated as Cubic Centimeters of Water Lost From White Spherical Atmometers, for Various Indicated Stations—Concluded

| Date | Owensville | Paulding | Ravenna | St. Clairsville | Shawnee | Strongsville |
|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | |
| 6/ 1–6/ 7 | 181 | 170 | 178 | 181 | 201 | 160 |
| 6/ 8–6/14 | 201 | 178 | 225 | 189 | 147 | 178 |
| 6/15–6/21 | 234 | 227 | 306 | 179 | 188 | 265 |
| 6/22–6/28 | 164 | 195 | 173 | 192 | 150 | 169 |
| 6/29–7/ 5 | 172 | 280 | 134 | 223 | 128 | 246 |
| 7/ 6–7/12 | 233 | 221 | 236 | 328 | 177 | 223 |
| 7/13–7/19 | 227 | 210 | 255 | 343 | 130 | 221 |
| 7/20–7/26 | 210 | 306 | 247 | 297 | 131 | 275 |
| 7/27–8/ 2 | 226 | 230 | 343 | 244 | 176 | 423 |
| 8/ 3–8/ 9 | 172 | 296 | 261 | 247 | 169 | 354 |
| 8/10–8/16 | 107 | 188 | 200 | 263 | 107 | 173 |
| 8/17–8/23 | 137 | 180 | 205 | 179 | 119 | 221 |
| 8/24–8/30 | 142 | 216 | 185 | 129 | 116 | 207 |
| 8/31–9/ 6 | 163 | 146 | 168 | 173 | 119 | 230 |
| 9/ 7–9/13 | 213 | 220 | 247 | 157 | 140 | 280 |
| 9/14–9/20 | 183 | 218 | 202 | 139 | 141 | 205 |
| 4-week totals | | | | | | |
| 6/ 1–6/28 | 780 | 770 | 882 | 741 | 686 | 772 |
| 6/29–7/26 | 842 | 1017 | 872 | 1191 | 566 | 965 |
| 7/27–8/23 | 642 | 894 | 1009 | 933 | 571 | 1171 |
| 8/24–9/20 | 701 | 800 | 802 | 598 | 516 | 922 |
| 16-week total | 2965 | 3481 | 3565 | 3463 | 2339 | 3830 |

| Date | Troy | Unionville | Venice | Wauseon | Willard | Woodsfield | Wooster |
|---|---|---|---|---|---|---|---|
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| Weekly losses | | | | | | | |
| 6/ 1–6/ 7 | 155 | 121 | 187 | 182 | 138 | 195 | 153 |
| 6/ 8–6/14 | 191 | 174 | 180 | 197 | 198 | 198 | 165 |
| 6/15–6/21 | 211 | 237 | 314 | 311 | 231 | 273 | 223 |
| 6/22–6/28 | 178 | 150 | 204 | 233 | 184 | 190 | 171 |
| 6/29–7/ 5 | 190 | 230 | 286 | 185 | 240 | 237 | 225 |
| 7/ 6–7/12 | 182 | 226 | 255 | 277 | 257 | 268 | 236 |
| 7/13–7/19 | 293 | 171 | 314 | 201 | 221 | 311 | 256 |
| 7/20–7/26 | 211 | 183 | 332 | 224 | 198 | 205 | 213 |
| 7/27–8/ 2 | 258 | 259 | 321 | 279 | 313 | 251 | 298 |
| 8/ 3–8/ 9 | 220 | 226 | 325 | 240 | 228 | 188 | 305 |
| 8/10–8/16 | 146 | 165 | 194 | 185 | 150 | 139 | 151 |
| 8/17–8/23 | 139 | 184 | 234 | 169 | 216 | 120 | 210 |
| 8/24–8/30 | 167 | 174 | 225 | 240 | 157 | 141 | 165 |
| 8/31–9/ 6 | 167 | 152 | 276 | 162 | 147 | 145 | 139 |
| 9/ 7–9/13 | 200 | 237 | 233 | 275 | 183 | 168 | 192 |
| 9/14–9/20 | 201 | 181 | 194 | 165 | 126 | 148 | 169 |
| 4-week totals | | | | | | | |
| 6/ 1–6/28 | 735 | 682 | 885 | 923 | 751 | 856 | 712 |
| 6/29–7/26 | 876 | 810 | 1187 | 887 | 916 | 1021 | 930 |
| 7/27–8/23 | 763 | 834 | 1074 | 873 | 907 | 698 | 964 |
| 8/24–9/20 | 735 | 744 | 928 | 842 | 613 | 602 | 665 |
| 16-week total | 3109 | 3070 | 4074 | 3525 | 3187 | 3177 | 3271 |

## TABLE 4.—Inches of Rainfall at or Near Evaporation Stations for Four 4-week Periods

A. From May 31 to September 19, 1926

| Atmometer station | Rainfall station | May 31 to June 27 | June 28 to July 25 | July 26 to Aug. 22 | Aug. 23 to Sept. 19 | May 31 to Sept. 19 |
|---|---|---|---|---|---|---|
| | | *In.* | *In.* | *In.* | *In.* | *In.* |
| Ada | Kenton | 3.01 | 3.11 | 6.38 | 6.29 | 18.79 |
| Athens | Athens | 5.14 | 5.45 | 7.72 | 4.72 | 23.03 |
| Aylmer, Can. | St. Thomas | 1.93 | 0.83 | 8.25 | 3.16 | 14.17 |
| Bryan | Montpelier | 3.76 | 1.24 | 4.69 | 5.48 | 15.17 |
| Caldwell | Summerfield and Beverly | 3.21 | 3.78 | 7.05 | 3.60 | 17.64 |
| Carroll | Lancaster | 2.65 | 2.89 | 7.88 | 2.49 | 15.91 |
| Chillicothe | Chillicothe | 4.31 | 4.40 | 11.30 | 2.40 | 22.41 |
| Columbus | Ohio State University | 1.14 | 2.04 | 8.98 | 3.96 | 16.12 |
| Cortland | Warren | 3.30 | 3.45 | 5.27 | 6.02 | 18.04 |
| Enterprise | Lancaster | 2.91 | 3.18 | 8.67 | 2.74 | 17.50 |
| Greenville | Greenville | 3.98 | 2.19 | 6.93 | 7.23 | 20.33 |
| Guelph, Can. | Kitchener and Guelph | 3.97 | 1.66 | 7.27 | 4.50 | 17.40 |
| Harrow, Can. | Harrow | 3.64 | 0.59 | 4.61 | 3.83 | 12.67 |
| London | London | 1.88 | 1.49 | 9.05 | 4.30 | 16.72 |
| Marietta | Marietta | 3.87 | 5.78 | 6.76 | 2.98 | 19.39 |
| Monroe, Mich. | Monroe | 2.95 | 0.80 | 6.22 | 4.32 | 14.29 |
| Mt. Vernon | Mt. Vernon | 1.93 | 2.10 | 5.78 | 5.31 | 15.12 |
| New Concord | Cambridge and Zanesville | 2.65 | 2.93 | 6.19 | 5.99 | 17.76 |
| Painesville | Willoughby | 2.30 | 0.72 | 6.57 | 5.21 | 14.80 |
| Paulding | Paulding | 3.40 | 4.67 | 6.08 | 4.30 | 18.45 |
| Proctorville | Dam No. 28 | 2.43 | 4.31 | 4.13 | 1.84 | 12.71 |
| St. Clairsville | Demos | 4.16 | 2.28 | 7.01 | 6.95 | 20.40 |
| Sandusky | Sandusky | 1.52 | 1.26 | 5.03 | 3.88 | 11.69 |
| St. Williams, Can. | Pt. Dover | 2.99 | 0.60 | 9.48 | 4.18 | 17.25 |
| Tilbury, Can. | Chatham | 2.57 | 0.63 | 6.53 | 3.59 | 13.32 |
| Washington C. H. | Washington C. H.* | 4.06 | 2.39 | 12.04 | 3.69 | 22.18 |
| Woodsfield | Summerfield | 2.82 | 3.05 | 5.97 | 4.13 | 15.97 |
| Wooster | Wooster | 3.58 | 1.37 | 3.80 | 7.11 | 15.86 |

*Washington Court House.

B. From May 30 to September 18, 1927

| Atmometer station | Rainfall station | May 30 to June 26 | June 27 to July 24 | July 25 to Aug. 21 | Aug. 22 to Sept. 18 | May 30 to Sept. 18 |
|---|---|---|---|---|---|---|
| | | *In.* | *In.* | *In.* | *In.* | *In.* |
| Ada | Kenton | 3.42 | 4.13 | 2.52 | 4.79 | 14.86 |
| Athens | Athens | 4.67 | 3.26 | 4.65 | 0.60 | 13.18 |
| Caldwell | Summerfield and Beverly | 4.72 | 4.07 | 2.98 | 1.57 | 13.34 |
| Carroll | Lancaster | 6.00 | 7.25 | 1.47 | 0.78 | 15.50 |
| Chillicothe | Chillicothe | 6.29 | 3.39 | 3.37 | 1.84 | 14.89 |
| Columbus | Ohio State University | 4.62 | 3.24 | 2.47 | 1.68 | 12.01 |
| Enterprise | Lancaster | 6.00 | 7.25 | 1.47 | 0.78 | 15.50 |
| Frankfort | Chillicothe | 6.29 | 3.39 | 3.37 | 1.84 | 14.89 |
| London | London | 3.52 | 2.14 | 2.35 | 3.70 | 11.71 |
| Marietta | Marietta | 3.96 | 4.09 | 5.60 | 1.63 | 15.28 |
| Minerva | Canton | 4.45 | 2.82 | 3.37 | 0.65 | 11.29 |
| Mt. Healthy | Mt. Healthy | 3.34 | 2.08 | 5.13 | 2.82 | 13.37 |
| Mt. Vernon | Mt. Vernon | 4.02 | 4.50 | 3.82 | 4.15 | 16.49 |
| New Concord | Cambridge and Zanesville | 4.73 | 3.94 | 2.16 | 2.00 | 12.83 |
| Painesville | Willoughby | 2.37 | 1.18 | 0.50 | 1.58 | 5.63 |
| Proctorville | Dam No. 28 | 5.69 | 1.71 | 5.02 | 1.29 | 13.71 |
| Russellville | Chilo | 5.74 | 3.62 | 3.98 | 0.57 | 13.91 |
| St. Clairsville | Demos | 4.27 | 2.61 | 2.20 | 3.31 | 12.39 |
| Sandusky | Sandusky | 2.71 | 4.61 | 2.52 | 1.83 | 11.67 |
| Strongsville | Oberlin | 1.08 | 2.82 | 2.13 | 2.47 | 8.50 |
| Upper Sandusky | Upper Sandusky | 2.98 | 4.65 | 3.80 | 4.41 | 15.84 |
| Washington C. H. | Washington C. H. | 4.03 | 3.41 | 3.20 | 1.31 | 11.95 |
| Woodsfield | Summerfield | 4.64 | 3.79 | 2.82 | 2.89 | 14.14 |
| Wooster | Wooster | 3.37 | 3.71 | 2.70 | 3.12 | 12.90 |

**TABLE 4.—Inches of Rainfall at or Near Evaporation Stations for Four 4-week Periods—Continued**

C. From May 29 to September 17, 1928

| Atmometer station | Rainfall station | May 29 to June 25 | June 26 to July 23 | July 24 to Aug. 20 | Aug. 21 to Sept. 17 | May 29 to Sept. 17 |
|---|---|---|---|---|---|---|
| | | *In.* | *In.* | *In.* | *In.* | *In.* |
| Athens | Athens | 6.15 | 4.62 | 1.73 | 1.65 | 14.15 |
| Bellefontaine | Bellefontaine | 7.55 | 3.11 | 0.88 | 1.80 | 13.34 |
| Bono | Catawba | 3.71 | 2.75 | 4.01 | 1.37 | 11.84 |
| Bowling Green | Bowling Green | 4.87 | 4.22 | 1.08 | 2.33 | 12.50 |
| Bryan | Montpelier | 3.56 | 4.10 | 1.31 | 3.35 | 12.32 |
| Bryan Park | Miamisburg | 7.71 | 3.30 | 2.10 | 1.26 | 14.37 |
| Caldwell | Summerfield | 7.29 | 7.27 | 2.19 | 1.45 | 18.20 |
| Carroll | Lancaster | 8.56 | 5.01 | 1.38 | 0.95 | 15.90 |
| Castalia | Vickery | 4.24 | 3.56 | 1.48 | 1.12 | 10.40 |
| Cleveland | Cleveland | 3.95 | 3.94 | 4.32 | 0.64 | 12.85 |
| Columbus | Ohio State University | 6.90 | 7.39 | 0.88 | 1.88 | 17.05 |
| Delaware | Delaware | 6.90 | 3.73 | 2.30 | 1.35 | 14.28 |
| Elyria | Oberlin | 5.84 | 5.72 | 2.54 | 0.61 | 14.71 |
| Enterprise | Lancaster | 8.56 | 5.01 | 1.38 | 0.95 | 15.90 |
| Frankfort | Chillicothe | 8.88 | 5.68 | 1.89 | 2.79 | 19.24 |
| Ironton | Ironton | 4.71 | 7.32 | 3.88 | 3.13 | 19.04 |
| Lafayette | Lima | 5.62 | 5.11 | 1.93 | 0.97 | 13.63 |
| Marietta | Marietta | 6.72 | 4.61 | 2.99 | 3.48 | 17.80 |
| Mt. Vernon | Mt. Vernon | 4.72 | 3.88 | 1.87 | 1.39 | 11.86 |
| New Concord | Cambridge | 7.47 | 6.98 | 2.54 | 1.18 | 18.17 |
| Oak Harbor | Fremont | 3.71 | 2.75 | 4.01 | 1.37 | 11.84 |
| Painesville | Willoughby | 4.84 | 3.36 | 1.60 | 1.39 | 11.19 |
| Proctorville | Dam No. 28 | 3.69 | 6.36 | 3.41 | 2.64 | 16.10 |
| Ravenna | Charleston | 5.43 | 7.62 | 1.49 | 1.71 | 16.25 |
| St. Clairsville | Demos | 5.11 | 9.11 | 2.24 | 2.00 | 18.46 |
| Sandusky | Sandusky | 5.10 | 3.68 | 1.70 | 2.25 | 12.73 |
| Shawnee | Portsmouth | 3.75 | 6.29 | 1.89 | 1.38 | 13.31 |
| Toledo | Toledo | 3.26 | 3.72 | 2.15 | 2.28 | 11.41 |
| Washington C. H. | Washington C. H. | 8.32 | 6.24 | 1.17 | 2.33 | 18.06 |
| Waterloo | Athens | 6.15 | 4.62 | 1.73 | 0.73 | 13.23 |
| Wauseon | Wauseon | 3.34 | 2.93 | 1.12 | 2.09 | 9.48 |
| Willard | Norwalk | 5.83 | 5.56 | 0.86 | 1.62 | 13.87 |
| Woodsfield | Summerfield | 7.29 | 7.27 | 2.19 | 1.45 | 18.20 |
| Wooster | Wooster | 4.26 | 4.46 | 3.99 | 0.60 | 13.31 |

D. From May 27 to September 15, 1929

| Atmometer station | Rainfall station | May 27 to June 23 | June 24 to July 21 | July 22 to Aug. 18 | Aug. 19 to Sept. 15 | May 27 to Sept. 15 |
|---|---|---|---|---|---|---|
| | | *In.* | *In.* | *In.* | *In.* | *In.* |
| Ada | Kenton | 3.22 | 6.26 | 4.51 | 1.43 | 15.42 |
| Athens | Athens | 1.28 | 2.31 | 2.89 | 4.10 | 10.58 |
| Bryan | Montpelier | 1.79 | 3.44 | 1.22 | 2.53 | 8.98 |
| Bryan Park | Miamisburg | 4.10 | 8.54 | 1.60 | 3.41 | 17.65 |
| Canfield | Canfield | 2.13 | 7.14 | 1.28 | 2.75 | 13.30 |
| Carroll | Lancaster | 1.69 | 2.40 | 4.43 | 5.25 | 13.77 |
| Columbus | Ohio State University | 2.80 | 4.73 | 3.84 | 2.09 | 13.46 |
| Cortland | Cortland | 0.80 | 5.39 | 2.22 | 2.19 | 10.60 |
| Delaware | Delaware | 2.08 | 5.95 | 3.89 | 2.20 | 14.12 |
| Enterprise | Lancaster | 1.69 | 2.40 | 4.43 | 5.25 | 13.77 |
| Holgate | Napoleon | 1.81 | 7.07 | 1.26 | 2.13 | 12.27 |
| Marietta | Marietta | 3.23 | 3.93 | 1.83 | 3.24 | 12.23 |
| McGuffey | Kenton | 3.22 | 6.26 | 4.51 | 1.43 | 15.42 |
| New Concord | Cambridge | 2.53 | 6.01 | 2.01 | 4.78 | 15.33 |
| Oak Harbor | Catawba | 2.46 | 3.95 | 1.30 | 0.68 | 8.39 |
| Paulding | Paulding | 3.61 | 4.49 | 2.85 | 2.10 | 13.05 |
| Ravenna | Charleston | 1.78 | 6.03 | 1.47 | 2.13 | 11.41 |
| Russellville | Peebles | 2.49 | 2.92 | 2.16 | 5.22 | 12.79 |
| St. Clairsville | Demos | 1.51 | 3.25 | 2.85 | 2.77 | 10.38 |
| Shawnee | Portsmouth | 1.54 | 5.23 | 4.00 | 3.92 | 14.69 |
| Strongsville | Oberlin | 2.12 | 7.06 | 2.67 | 0.98 | 12.83 |
| Waterloo | Athens | 1.28 | 2.31 | 2.89 | 4.10 | 10.58 |
| Wauseon | Wauseon | 1.76 | 4.75 | 1.90 | 2.32 | 10.73 |
| Willard | Norwalk | 5.65 | 6.94 | 2.99 | 0.66 | 16.24 |
| Woodsfield | Summerfield | 1.95 | 4.51 | 3.05 | 4.32 | 13.83 |
| Wooster | Wooster | 3.08 | 7.59 | 2.15 | 0.98 | 13.80 |

**TABLE 4.—Inches of Rainfall at or Near Evaporation Stations for Four 4-week Periods—Continued**

E. From May 26 to September 14, 1930

| Atmometer station | Rainfall station | May 26 to June 22 | June 23 to July 20 | July 21 to Aug. 17 | Aug. 18 to Sept. 14 | May 26 to Sept. 14 |
|---|---|---|---|---|---|---|
| | | *In.* | *In.* | *In.* | *In.* | *In.* |
| Ada | Kenton | 2.89 | 1.86 | 1.86 | 3.69 | 10.30 |
| Athens | Athens | 1.09 | 2.26 | 1.88 | 2.80 | 8.03 |
| Bladensburg | Mt. Vernon | 1.65 | 0.57 | 2.10 | 2.62 | 6.94 |
| Bryan | Montpelier | 1.72 | 0.21 | 2.17 | 1.41 | 5.51 |
| Bryan Park | Miamisburg | 2.55 | 1.16 | 3.09 | 3.38 | 10.18 |
| Canfield | Canfield | 2.78 | 1.46 | 1.95 | 2.16 | 8.35 |
| Carpenter | McArthur | 0.64 | 1.80 | 3.19 | 2.11 | 7.74 |
| Carroll | Lancaster | 1.37 | 2.76 | 1.22 | 2.23 | 7.58 |
| Chillicothe | Chillicothe | 0.30 | 1.36 | 2.15 | 2.47 | 6.28 |
| Cleveland | Cleveland | 1.94 | 0.71 | 0.46 | 1.91 | 5.02 |
| Columbus | Columbus | 1.66 | 1.17 | 1.15 | 2.52 | 6.50 |
| Cortland | Cortland | 3.52 | 2.39 | 0.47 | 2.69 | 9.07 |
| Delaware | Delaware | 2.33 | 0.60 | 2.45 | 2.11 | 7.49 |
| Enterprise | Lancaster | 0.79 | 0.63 | 1.51 | 2.66 | 5.59 |
| Findlay | Findlay | 2.28 | 1.84 | 1.57 | 1.00 | 6.69 |
| Gallipolis | Gallipolis | 1.06 | 1.30 | 2.89 | 1.76 | 7.01 |
| Germantown | Germantown | 1.85 | 0.70 | 1.98 | 3.09 | 7.62 |
| Hillsboro | Hillsboro | 1.81 | 2.03 | 1.89 | 4.99 | 10.72 |
| Holgate | Holgate | 3.04 | 0.32 | 3.36 | 0.80 | 7.52 |
| London | London | 2.31 | 0.19 | 2.23 | 2.60 | 7.33 |
| Marietta | Marietta | 0.45 | 1.55 | 2.12 | 1.79 | 5.91 |
| Mendon | New Bremen | 2.14 | 1.49 | 2.32 | 3.06 | 9.01 |
| Mt. Healthy | Mt. Healthy | 0.92 | 0.72 | 2.13 | 2.73 | 6.50 |
| New Concord | Zanesville | 1.25 | 1.29 | 0.63 | 1.30 | 4.47 |
| Oak Harbor | Catawba | 1.71 | 1.10 | 1.50 | 0.99 | 5.30 |
| Owensville | Batavia | 0.53 | 0.61 | 1.52 | 1.64 | 4.30 |
| Paulding | Paulding | 3.02 | 0.67 | 2.08 | 1.25 | 7.02 |
| Ravenna | Charleston | 2.30 | 2.24 | 1.02 | 2.20 | 7.76 |
| St. Clairsville | Demos | 1.84 | 1.41 | 1.05 | 2.54 | 6.84 |
| Shawnee | Portsmouth | 0.49 | 1.26 | 1.65 | 2.38 | 5.78 |
| Strongsville | Brecksville | 3.81 | 0.85 | 1.06 | 1.22 | 6.94 |
| Troy | Piqua | 2.91 | 1.42 | 2.72 | 3.54 | 10.59 |
| Unionville | Willoughby | 2.40 | 0.87 | 0.61 | 2.36 | 6.24 |
| Venice | Sandusky | 2.83 | 0.66 | 1.17 | 1.15 | 5.81 |
| Waterloo | Athens | 1.09 | 2.26 | 1.88 | 2.80 | 8.03 |
| Wauseon | Wauseon | 2.63 | 0.23 | 2.46 | 0.40 | 5.72 |
| Willard | Norwalk | 1.98 | 1.50 | 0.67 | 1.63 | 5.78 |
| Woodsfield | Summerfield | 1.37 | 2.76 | 1.22 | 2.23 | 7.58 |
| Wooster | Wooster | 1.40 | 2.46 | 1.24 | 2.29 | 7.39 |

F. From June 1 to September 21, 1931

| Atmometer station | Rainfall station | June 1 to June 28 | June 29 to July 26 | July 27 to Aug. 23 | Aug. 24 to Sept. 21 | June 1 to Sept. 21 |
|---|---|---|---|---|---|---|
| | | *In.* | *In.* | *In.* | *In.* | *In.* |
| Ada | Kenton | 2.61 | 4.91 | 2.20 | 2.71 | 12.43 |
| Athens | Athens | 3.62 | 2.57 | 4.18 | 1.78 | 12.15 |
| Bladensburg | Mt. Vernon | 3.13 | 3.11 | 5.83 | 3.74 | 15.81 |
| Bowling Green | Bowling Green | 2.62 | 4.32 | 1.22 | 2.94 | 11.10 |
| Bryan | Montpelier | 3.75 | 5.11 | 1.30 | 4.03 | 14.19 |
| Bryan Park | Miamisburg | 4.59 | 4.48 | 4.35 | 3.23 | 16.65 |
| Canfield | Canfield | 4.30 | 2.23 | 3.53 | 2.76 | 12.82 |
| Carpenter | McArthur | 4.59 | 4.90 | 4.51 | 2.97 | 16.97 |
| Carroll | Lancaster | 2.01 | 3.39 | 5.57 | 7.06 | 18.03 |
| Chesapeake | Dam No. 28 | 2.01 | 4.40 | 3.19 | 1.62 | 11.22 |
| Cleveland | Cleveland | 3.51 | 2.16 | 1.52 | 3.79 | 10.98 |
| Columbus | Ohio State University | 2.76 | 4.40 | 7.06 | 3.21 | 17.43 |
| Cortland | Cortland | 3.15 | 4.76 | 1.58 | 4.00 | 13.49 |
| Delaware | Delaware | 1.76 | 4.45 | 5.58 | 3.80 | 15.59 |
| Enterprise | Lancaster | 2.13 | 5.98 | 5.09 | 4.41 | 17.61 |
| Findlay | Findlay | 2.12 | 4.92 | 2.36 | 3.57 | 12.97 |
| Gallipolis | Gallipolis | 1.33 | 6.26 | 3.61 | 1.51 | 12.71 |
| Germantown | Germantown | 3.51 | 4.74 | 4.15 | 2.95 | 15.35 |
| Hillsboro | Hillsboro | 2.37 | 6.09 | 5.80 | 4.09 | 18.35 |
| Holgate | Holgate | 2.67 | 3.77 | 1.54 | 2.26 | 10.24 |
| London | London | 1.45 | 6.25 | 5.00 | 4.05 | 16.75 |
| Marietta | Marietta | 4.17 | 2.05 | 3.05 | 2.41 | 11.68 |

**TABLE 4.—Inches of Rainfall at or Near Evaporation Stations for Four 4-week Periods—Concluded**

| Atmometer station | Rainfall station | June 1 to June 28 | June 29 to July 26 | July 27 to Aug. 23 | Aug. 24 to Sept. 21 | June 1 to Sept. 21 |
|---|---|---|---|---|---|---|
| | | *In.* | *In.* | *In.* | *In.* | *In.* |
| Mt. Healthy | Mt. Healthy | 2.53 | 6.91 | 2.33 | 3.58 | 15.35 |
| New Concord | Zanesville | 4.34 | 3.20 | 4.53 | 3.81 | 15.88 |
| Oak Harbor | Catawba | 1.96 | 0.62 | 4.57 | 2.83 | 9.98 |
| Owensville | Batavia | 3.73 | 6.73 | 6.28 | 3.10 | 19.84 |
| Paulding | Paulding | 2.07 | 6.03 | 2.10 | 2.23 | 12.43 |
| Ravenna | Charleston | 3.44 | 2.98 | 2.25 | 3.85 | 12.52 |
| St. Clairsville | Demos | 2.97 | 5.00 | 4.28 | 7.25 | 19.50 |
| Shawnee | Portsmouth | 3.24 | 6.81 | 4.74 | 1.11 | 15.90 |
| Strongsville | Brecksville | 4.41 | 1.48 | 2.05 | 2.20 | 10.14 |
| Troy | Piqua | 2.70 | 7.93 | 3.14 | 2.61 | 16.38 |
| Unionville | Willoughby | 5.56 | 3.46 | 1.47 | 3.70 | 14.19 |
| Venice | Sandusky | 2.99 | 0.87 | 5.87 | 3.44 | 13.17 |
| Wauseon | Wauseon | 4.41 | 5.50 | 1.37 | 1.81 | 13.09 |
| Willard | Norwalk | 2.62 | 2.08 | 6.20 | 4.45 | 15.35 |
| Woodsfield | Summerfield | 2.01 | 3.39 | 5.57 | 7.06 | 18.03 |
| Wooster | Wooster | 3.16 | 3.06 | 2.60 | 4.82 | 13.64 |

## *EVAPORATION-RAINFALL RATIOS*

Water falling as rain is the chief source of moisture for plant growth. However, rainfall data should not be considered as the sole criterion of moisture conditions. After this water has been received and a portion of it absorbed by the soil, the rate at which it in turn is lost again from soil and plant surfaces is also an important factor in regulating plant growth. This is especially true with the approach of, and during, drouth conditions, such as prevailed in 1930 and 1934 (1). Thus, the evaporation rate, as well as rainfall, should be considered in evaluating the moisture conditions of a region over any given period of time. This relationship between the two factors is usually spoken of as the rainfall-evaporation ratio (76) and it shows the relative rates of reception and loss of water. If this ratio is represented by a value greater than unity, a moisture deficiency is not usually a limiting factor in plant growth; however, if this ratio remains below unity for any extended period of time, drouth conditions will prevail and many plants will suffer from a lack of soil moisture.

Just what constitutes a drouth is difficult to define clearly, and, of course, it varies with the climatological history of each case. The following definition by Henry, which was recently mentioned by Alexander (1), may be accepted until a better one is advanced: "A drouth is considered to exist whenever the rainfall for a period of 21 days or longer is but 30 per cent of the average for the time and place." However, this fails to take into account possible variations in the evaporation rate, and these might advance or retard the rate of drouth initiation as indicated by plant behavior. The use of an evaporation index, such as that used by Wilson and Welton (89) in watering lawns, should make it possible to determine more definitely when a certain degree of dryness has been attained during the initiatory period of a drouth.

As mentioned previously, the relation between rainfall and evaporation, as it affects plant distribution, was first considered by Transeau (76) in mapping various vegetation formations of the eastern United States. It has since been used in a similar way by Livingston (39, 43), Sampson (59), Shantz (61), and Davidson (14); it has also been used by Briggs (8), Kincer (35, 36), Mattice (47), and Bogue (7) in studies on the geographic distribution of crop plants.

The evaporation data of Table 3 and those for rainfall in Table 4 have been utilized to compute the values for the evaporation-rainfall ratio for a 16-week period at each atmometer station. The results are given in Table 5. The usual R/E ratio has been inverted and stated as E/R for the sake of convenience, since the ratio values in these data then represent the number of cubic centimeters of water lost from the white atmometer per inch of rainfall received. These values may be transformed into inches of water evaporated per inch of rainfall by dividing the value of E/R in any particular instance by the factor 190, which represents the approximate relationship existing between the loss of water from the Standard Weather Bureau open pan and the white atmometer at Wooster, Ohio (86).

An inspection of the E/R value for the different years of the survey indicates that only a few stations in 1926 lost water more rapidly than it was received as rain, and, as a result, the average E/R value of 144 for all stations was considerably below that representing an E/R value of unity, or 190. Approximately half of the stations used in 1927 received water faster than it was lost. This was also true of 1928. This number dropped to less than one-third of the total in 1929 and 1931, and in 1930 no station received an amount of water greater than was lost by evaporation.

**TABLE 5.—Evaporation and Rainfall Totals and the Evaporation-Rainfall Ratio at Various Stations for a Period of 16 Weeks**

A. From May 31 to September 19, 1926

| Atmometer station | Evaporation | Rainfall | E/R |
|---|---|---|---|
| | *Cc.* | *In.* | |
| Ada | 2460 | 18.79 | 131 |
| Athens | 1530 | 23.03 | 66 |
| Aylmer, Canada | 2355 | 14.17 | 166 |
| Bryan | 1989 | 15.17 | 131 |
| Caldwell | 2270 | 17.64 | 129 |
| Carroll | 2815 | 15.91 | 177 |
| Chillicothe | 2032 | 22.41 | 91 |
| Columbus | 2892 | 16.12 | 179 |
| Cortland | 2442 | 18.04 | 135 |
| Enterprise | 1813 | 17.50 | 104 |
| Greenville | 2460 | 20.33 | 121 |
| Guelph, Canada | 2664 | 17.40 | 153 |
| Harrow, Canada | 2975 | 12.67 | 235 |
| London | 2288 | 16.72 | 137 |
| Marietta | 2066 | 19.39 | 107 |
| Monroe, Mich. | 2344 | 14.29 | 164 |
| Mt. Vernon | 2267 | 15.12 | 150 |
| New Concord | 3150 | 17.76 | 177 |
| Painesville | 2972 | 14.80 | 201 |
| Paulding | 2079 | 18.45 | 113 |
| Proctorville | 1852 | 12.71 | 146 |
| St. Clairsville | 2156 | 20.40 | 106 |
| Sandusky | 3383 | 11.69 | 289 |
| St. Williams, Canada | 2773 | 17.25 | 161 |
| Tilbury, Canada | 3176 | 13.32 | 238 |
| Washington Court House | 1801 | 22.18 | 81 |
| Woodsfield | 2339 | 15.97 | 146 |
| Wooster | 3224 | 15.86 | 203 |
| Average | 2449 | 16.97 | 144 |

**TABLE 5.—Evaporation and Rainfall Totals and the Evaporation-Rainfall Ratio at Various Stations for a Period of 16 Weeks—Continued**

B. From May 30 to September 18, 1927

| Atmometer station | Evaporation | Rainfall | E/R |
|---|---|---|---|
| | *Cc.* | *In.* | |
| Ada | 2732 | 14.86 | 184 |
| Athens | 2320 | 13.18 | 176 |
| Caldwell | 2406 | 13.34 | 180 |
| Carroll | 2691 | 15.50 | 174 |
| Chillicothe | 2072 | 14.89 | 139 |
| Columbus | 3192 | 12.01 | 266 |
| Enterprise | 2235 | 15.50 | 151 |
| Frankfort | 2329 | 14.89 | 156 |
| London | 2991 | 11.71 | 255 |
| Marietta | 2349 | 15.28 | 154 |
| Minerva | 3161 | 11.29 | 280 |
| Mt. Healthy | 2941 | 13.37 | 220 |
| Mt. Vernon | 2463 | 16.49 | 149 |
| New Concord | 3082 | 12.83 | 240 |
| Painesville | 3470 | 5.63 | 616 |
| Proctorville | 2359 | 13.71 | 172 |
| Russellville | 2196 | 13.91 | 157 |
| St. Clairsville | 2620 | 12.39 | 211 |
| Sandusky | 3031 | 11.67 | 259 |
| Strongsville | 3920 | 8.50 | 461 |
| Upper Sandusky | 3028 | 15.84 | 191 |
| Washington Court House | 2340 | 11.95 | 196 |
| Woodsfield | 2378 | 14.14 | 168 |
| Wooster | 3004 | 12.90 | 233 |
| Average | 2721 | 13.16 | 207 |

**TABLE 5.—Evaporation and Rainfall Totals and the Evaporation-Rainfall Ratio at Various Stations for a Period of 16 Weeks—Continued**

C. From May 29 to September 17, 1928

| Atmometer station | Evaporation | Rainfall | E/R |
|---|---|---|---|
| | *Cc.* | *In.* | |
| Athens | 2318 | 14.15 | 164 |
| Bellefontaine | 2449 | 13.34 | 184 |
| Bono | 2685 | 11.84 | 227 |
| Bowling Green | 2444 | 12.50 | 196 |
| Bryan | 2297 | 12.32 | 186 |
| Bryan Park | 3428 | 14.37 | 239 |
| Caldwell | 2058 | 18.20 | 113 |
| Carroll | 2526 | 15.90 | 159 |
| Castalia | 3113 | 10.40 | 299 |
| Cleveland | 2827 | 12.85 | 220 |
| Columbus | 2789 | 17.05 | 164 |
| Delaware | 2741 | 14.28 | 192 |
| Elyria | 2822 | 14.71 | 192 |
| Enterprise | 2416 | 15.90 | 152 |
| Frankfort | 2418 | 19.24 | 126 |
| Ironton | 2148 | 19.04 | 113 |
| Lafayette | 2460 | 13.63 | 180 |
| Marietta | 2281 | 17.80 | 128 |
| Mt. Vernon | 3052 | 11.86 | 257 |
| New Concord | 2856 | 18.17 | 157 |
| Oak Harbor | 2527 | 11.84 | 213 |
| Painesville | 2434 | 11.19 | 218 |
| Proctorville | 1817 | 16.10 | 113 |
| Ravenna | 2827 | 16.25 | 174 |
| St. Clairsville | 2268 | 18.46 | 123 |
| Sandusky | 2741 | 12.73 | 215 |
| Shawnee | 1610 | 13.31 | 121 |
| Toledo | 2834 | 11.41 | 248 |
| Washington Court House | 2574 | 18.06 | 143 |
| Waterloo | 1893 | 13.23 | 144 |
| Wauseon | 2557 | 9.48 | 270 |
| Willard | 2811 | 13.87 | 203 |
| Woodsfield | 2007 | 18.20 | 110 |
| Wooster | 2938 | 13.31 | 221 |

**TABLE 5.—Evaporation and Rainfall Totals and the Evaporation-Rainfall Ratio at Various Stations for a Period of 16 Weeks—Continued**

D. From May 27 to September 15, 1929

| Atmometer station | Evaporation | Rainfall | E/R |
|---|---|---|---|
| | *Cc.* | *In.* | |
| Ada | 2197 | 15.42 | 142 |
| Athens | 2686 | 10.58 | 254 |
| Bryan | 2670 | 8.98 | 297 |
| Bryan Park | 2997 | 17.65 | 170 |
| Canfield | 3100 | 13.30 | 233 |
| Carroll | 2894 | 13.77 | 210 |
| Columbus | 3731 | 13.46 | 277 |
| Cortland | 3218 | 10.60 | 304 |
| Delaware | 2609 | 14.12 | 185 |
| Enterprise | 2835 | 13.77 | 206 |
| Holgate | 3225 | 12.27 | 263 |
| Marietta | 3080 | 12.23 | 252 |
| McGuffey | 2981 | 15.42 | 193 |
| New Concord | 2472 | 15.33 | 161 |
| Oak Harbor | 2804 | 8.39 | 334 |
| Paulding | 3467 | 13.05 | 266 |
| Ravenna | 3705 | 11.41 | 325 |
| Russellville | 2152 | 12.79 | 168 |
| St. Clairsville | 2844 | 10.38 | 274 |
| Shawnee | 2199 | 14.69 | 150 |
| Strongsville | 3530 | 12.83 | 275 |
| Waterloo | 1876 | 10.58 | 177 |
| Wauseon | 3283 | 10.73 | 306 |
| Willard | 3060 | 16.24 | 188 |
| Woodsfield | 3266 | 13.83 | 236 |
| Wooster | 3078 | 13.80 | 223 |

**TABLE 5.—Evaporation and Rainfall Totals and the Evaporation-Rainfall Ratio at Various Stations for a Period of 16 Weeks—Continued**

E. From May 26 to September 14, 1930

| Atmometer station | Evaporation | Rainfall | E/R |
|---|---|---|---|
| | *Cc.* | *In.* | |
| Ada | 4935 | 10.30 | 479 |
| Athens | 5033 | 8.03 | 627 |
| Bladensburg | 4273 | 6.94 | 616 |
| Bryan | 4714 | 5.51 | 856 |
| Bryan Park | 4886 | 10.18 | 480 |
| Canfield | 4619 | 8.35 | 553 |
| Carpenter | 3934 | 7.74 | 508 |
| Carroll | 5744 | 7.58 | 758 |
| Chillicothe | 4445 | 6.28 | 708 |
| Cleveland | 4839 | 5.02 | 962 |
| Columbus | 5194 | 6.50 | 799 |
| Cortland | 4298 | 9.07 | 474 |
| Delaware | 4242 | 7.49 | 567 |
| Enterprise | 5019 | 5.59 | 898 |
| Findlay | 4873 | 6.69 | 728 |
| Gallipolis | 3953 | 7.01 | 564 |
| Germantown | 5615 | 7.62 | 737 |
| Hillsboro | 4184 | 10.72 | 390 |
| Holgate | 4443 | 7.52 | 591 |
| London | 5043 | 7.33 | 688 |
| Marietta | 4555 | 5.91 | 771 |
| Mendon | 4449 | 9.01 | 494 |
| Mt. Healthy | 5323 | 6.50 | 819 |
| New Concord | 4375 | 4.47 | 979 |
| Oak Harbor | 4911 | 5.30 | 927 |
| Owensville | 5992 | 4.30 | 1393 |
| Paulding | 5104 | 7.02 | 727 |
| Ravenna | 4178 | 7.76 | 538 |
| St. Clairsville | 4647 | 6.84 | 679 |
| Shawnee | 4184 | 5.78 | 724 |
| Strongsville | 5101 | 6.94 | 735 |
| Troy | 4131 | 10.59 | 390 |
| Unionville | 3508 | 6.24 | 562 |
| Venice | 4415 | 5.81 | 760 |
| Waterloo | 3963 | 8.03 | 494 |
| Wauseon | 5127 | 5.72 | 896 |
| Willard | 4010 | 5.78 | 694 |
| Woodsfield | 5484 | 7.58 | 723 |
| Wooster | 4648 | 7.39 | 629 |

**TABLE 5.—Evaporation and Rainfall Totals and the Evaporation-Rainfall Ratio at Various Stations for a Period of 16 Weeks—Continued**

F. From June 1 to September 20, 1931

| Atmometer station | Evaporation | Rainfall | E/R |
|---|---|---|---|
| | *Cc.* | *In.* | |
| Ada | 3251 | 12.43 | 262 |
| Athens | 3120 | 12.15 | 257 |
| Bladensburg | 2930 | 15.81 | 185 |
| Bowling Green | 4026 | 11.10 | 363 |
| Bryan | 3032 | 14.19 | 214 |
| Bryan Park | 3158 | 16.65 | 190 |
| Canfield | 3494 | 12.82 | 273 |
| Carpenter | 2202 | 16.97 | 130 |
| Carroll | 3123 | 18.03 | 173 |
| Chesapeake | 3285 | 11.22 | 293 |
| Cleveland | 3546 | 10.98 | 323 |
| Columbus | 3869 | 17.43 | 222 |
| Cortland | 3193 | 13.49 | 237 |
| Delaware | 3015 | 15.59 | 193 |
| Enterprise | 2684 | 17.61 | 152 |
| Findlay | 3253 | 12.97 | 251 |
| Gallipolis | 2402 | 12.71 | 189 |
| Germantown | 3651 | 15.35 | 238 |
| Hillsboro | 2347 | 18.35 | 128 |
| Holgate | 3405 | 10.24 | 333 |
| London | 4075 | 16.75 | 243 |
| Marietta | 3371 | 11.68 | 289 |

**TABLE 5.—Evaporation and Rainfall Totals and the Evaporation-Rainfall Ratio at Various Stations for a Period of 16 Weeks—Concluded**

| Atmometer station | Evaporation | Rainfall | E/R |
|---|---|---|---|
| | *Cc.* | *In.* | |
| Mt. Healthy | 3813 | 15.35 | 248 |
| New Concord | 2563 | 15.88 | 161 |
| Oak Harbor | 3423 | 9.98 | 343 |
| Owensville | 2965 | 19.84 | 149 |
| Paulding | 3481 | 12.43 | 280 |
| Ravenna | 3565 | 12.52 | 285 |
| St. Clairsville | 3463 | 19.50 | 178 |
| Shawnee | 2339 | 15.90 | 147 |
| Strongsville | 3830 | 10.14 | 378 |
| Troy | 3109 | 16.38 | 190 |
| Unionville | 3070 | 14.19 | 216 |
| Venice | 4074 | 13.17 | 309 |
| Wauseon | 3525 | 13.09 | 269 |
| Willard | 3187 | 15.35 | 208 |
| Woodsfield | 3177 | 18.03 | 176 |
| Wooster | 3271 | 13.64 | 240 |

In Table 6 the data relative to evaporation, rainfall, and the evaporation-rainfall ratio have been summarized by 4-week periods for the years 1928-1931, inclusive. The average values of E/R for the different 4-week periods indicate that the period from July 24 to August 20 was probably the driest of the four 4-week periods included in the survey. This was true in spite of the fact that the period from August 21 to September 17 had approximately the same amount of rainfall, because the evaporation of the latter period was lower than that from July 24 to August 20. The 16-week averages for the different years again show 1929 and 1931 to have been similar in their E/R values, although the rainfall of 1931 exceeded that of 1929. The rainfall of 1928 was similar to that of 1931, but, due to the fact that the evaporation rate during the former summer was lower than in 1931, the E/R value indicates the latter to have been a drier year than the former. The extreme dryness of 1930 is again emphasized by an E/R value about three times as great as the average of the other 3 years. The rainfall for 1930 was approximately 50 per cent of the average for 1928, 1929, and 1931; however, the high evaporation rate in 1930 caused the E/R ratio value of that year to be three times as great as, instead of double, the average of the 3 other years, as would have been expected from a consideration of the rainfall values alone. A more detailed comparison of the drouth year of 1930 with other years more normal in their moisture relations is given in the following section of this bulletin. These data again call attention to the fact that the rainfall values alone do not afford sufficient material with which to evaluate the moisture conditions actually existent during any given period.

**TABLE 6.—Average Evaporation, Rainfall, and Evaporation-Rainfall Ratio Values of All Stations for 4-week Periods and the 16-week Totals for the Years 1928 to 1931, Inclusive**

| 4-week periods | Evaporation | | | | | Rainfall | | | | | E/R | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | 1930 | 1931 | Av. | 1928 | 1929 | 1930 | 1931 | Av. | 1928 | 1929 | 1930 | 1931 | Av. |
| May 29 to June 25 | 554 | 756 | 1067 | 818 | 799 | 5.71 | 2.37 | 1.86 | 3.06 | 3.25 | 97 | 319 | 574 | 267 | 246 |
| June 26 to July 23 | 603 | 731 | 1399 | 920 | 913 | 5.04 | 5.03 | 1.30 | 4.24 | 3.90 | 120 | 145 | 1076 | 217 | 234 |
| July 24 to Aug. 20 | 636 | 765 | 1355 | 791 | 887 | 2.12 | 2.70 | 1.76 | 3.73 | 2.58 | 300 | 283 | 770 | 212 | 344 |
| Aug. 21 to Sept. 17 | 735 | 674 | 852 | 717 | 744 | 1.69 | 2.81 | 2.22 | 3.44 | 2.54 | 435 | 240 | 384 | 208 | 293 |
| 16-week total or av. | 2528 | 2926 | 4673 | 3246 | 3343 | 14.56 | 12.91 | 7.14 | 14.47 | 12.27 | 174 | 227 | 654 | 224 | 273 |

## *EVAPORATION IN 1930*

The summer of 1930 was very dry in Ohio, particularly during the months of June and July. The normal rainfall for the State from May 25 to September 15, a period of 16 weeks, is approximately 13.50 inches (2). In 1930, the average at all of the stations used in the survey was 7.14 inches, or only 53 per cent of the normal. The years 1928 and 1931 were slightly wetter than normal during the 16-week period of the survey; whereas 1929 was somewhat drier. The average for the 3 years was only 0.20 of an inch above the normal.

Seventeen of the stations used during this survey were included each year of the 4-year period 1928 to 1931. Average values for evaporation, rainfall, and the evaporation-rainfall ratio for the three comparatively normal years of 1928, 1929, and 1931 were determined for each of these 17 stations. These values are compared with those of the drouth year of 1930 in Table 7. When only these 17 stations are considered, the evaporation in 1930 was 65 per cent greater than the 3-year average and the rainfall was only about 46 per cent as great as the average for these years. The evaporation-rainfall ratio was more than three and one-half times as great in 1930 as the 3-year average. Thus, although the weather seemed very dry when rainfall alone was considered, the real condition is still more clearly shown by the relative values of the evaporation-rainfall ratio.

TABLE 7.—**Comparison of Evaporation, Rainfall, and Evaporation-Rainfall Ratio During 16 Weeks of the Dry Season of 1930 with the Average of the Three More Normal Years of 1928, 1929, and 1931 at 17 Stations in Ohio**

| Station | Evaporation | | Rainfall | | E/R | |
|---|---|---|---|---|---|---|
| | 1928–1929–1931 average | 1930 | 1928–1929–1931 average | 1930 | 1928–1929–1931 average | 1930 |
| | *Cc.* | *Cc.* | *In.* | *In.* | | |
| Athens | 2708 | 5033 | 12.29 | 8.03 | 220 | 627 |
| Bryan | 2666 | 4714 | 11.83 | 5.51 | 225 | 855 |
| Bryan Park | 3194 | 4886 | 16.22 | 10.18 | 197 | 480 |
| Carroll | 2844 | 5744 | 15.90 | 7.58 | 179 | 758 |
| Columbus | 3463 | 5194 | 15.98 | 6.50 | 217 | 799 |
| Delaware | 2788 | 4242 | 14.66 | 7.49 | 190 | 579 |
| Enterprise | 2645 | 5019 | 15.76 | 5.59 | 168 | 898 |
| Marietta | 2911 | 4555 | 13.90 | 5.91 | 209 | 771 |
| New Concord | 2630 | 4375 | 16.46 | 4.47 | 160 | 979 |
| Oak Harbor | 2918 | 4911 | 10.07 | 5.30 | 290 | 927 |
| Ravenna | 3366 | 4178 | 13.39 | 7.76 | 251 | 538 |
| St. Clairsville | 2858 | 4647 | 16.11 | 6.84 | 177 | 670 |
| Shawnee | 2049 | 4184 | 14.63 | 5.78 | 140 | 724 |
| Wauseon | 3122 | 5127 | 11.10 | 5.72 | 281 | 896 |
| Willard | 3019 | 4010 | 15.15 | 5.78 | 199 | 693 |
| Woodsfield | 2817 | 5484 | 16.69 | 7.58 | 169 | 723 |
| Wooster | 3096 | 4648 | 13.58 | 7.39 | 228 | 629 |
| Average | 2888 | 4762 | 14.34 | 6.67 | 201 | 714 |
| Equivalent in inches | 15.20 | 25.06 | 14.34 | 6.67 | 1.06 | 3.76 |

The drouth became so severe in Ohio late in July and early August of 1930 that many trees and shrubs were severely injured and herbaceous forms killed (84, 87). Lawns were practically devoid of green color over long periods (81). Crop failures were common, and the average yields for many crops which mature in midsummer or later were much below the normal for the State (2, 56).

## *COMPARATIVE EVAPORATION RATES AT DIFFERENT STATIONS*

Analysis of the data recorded in Table 8 indicates that the rate of evaporation at the various stations is rather uniform. The range in the average evaporation at the 17 locations for a period of 16 weeks through the years 1928 to 1931, inclusive, was about 2600 to 3900 cubic centimeters. A difference of about 650 cubic centimeters between stations is required for trustworthy significance (16). On the contrary, the rate of evaporation for the 4 years is quite different, the averages for 1928 to 1931 being 2500, 3000, 4800, and 3300 cubic centimeters, respectively.

TABLE 8.—**Average Evaporation for 4 Years in 17 Locations**

| Station | Average evaporation | Station | Average evaporation |
|---|---|---|---|
| | *Cc.* | | *Cc.* |
| Shawnee | 2600 | New Concord | 3400 |
| Athens | 2900 | Wooster | 3500 |
| Bryan | 3200 | Woodsfield | 3600 |
| St. Clairsville | 3300 | Carroll | 3600 |
| Delaware | 3300 | Ravenna | 3600 |
| Willard | 3300 | Bryan Park | 3700 |
| Marietta | 3300 | Wauseon | 3700 |
| Oak Harbor | 3400 | Columbus | 3900 |
| Enterprise | 3400 | | |

As will be noted in the recorded data, 23 stations were maintained for a period of 3 successive years. Seventeen of these were identical with those included in the four-season group. These stations are listed in the order of their evaporation rate in Table 9.

**TABLE 9.—Average Evaporation Rate in 17 Locations for 3 Years**

| Station | Average evaporation | Station | Average evaporation |
|---|---|---|---|
| | *Cc.* | | *Cc.* |
| Shawnee | 3000 | Marietta | 3700 |
| Athens | 3200 | Oak Harbor | 3800 |
| Willard | 3500 | Bryan Park | 3800 |
| Bryan | 3500 | Canfield | 3800 |
| Enterprise | 3500 | Ravenna | 3800 |
| Delaware | 3500 | Carroll | 3900 |
| New Concord | 3500 | Paulding | 4000 |
| Ada | 3600 | Wauseon | 4000 |
| Cortland | 3600 | Woodsfield | 4100 |
| St. Clairsville | 3600 | Strongsville | 4100 |
| Holgate | 3700 | Columbus | 4300 |
| Wooster | 3700 | | |

A difference of about 600 cubic centimeters is required for significance in the evaporation rate between stations. It is apparent that the ratings of the various stations in Table 9 are quite similar to those included in Table 8.

The season of 1930 again stands out as one with a much greater evaporation rate than 1929 and 1931, which are practically identical.

An analysis of the evaporation rate at 36 stations for the years 1930 and 1931 revealed trends similar to those stated above. These stations, together with the average evaporation, are indicated in Table 10.

**TABLE 10.—Average Evaporation Rate in 36 Locations for 2 Years**

| Station | Average evaporation | Station | Average evaporation |
|---|---|---|---|
| | *Cc.* | | *Cc.* |
| Carpenter | 3000 | Canfield | 4050 |
| Gallipolis | 3150 | Findlay | 4050 |
| Hillsboro | 3250 | New Concord | 4100 |
| Unionville | 3300 | Ada | 4100 |
| Shawnee | 3350 | Cleveland | 4150 |
| Athens | 3400 | Bryan Park | 4150 |
| Bladensburg | 3550 | Oak Harbor | 4250 |
| Troy | 3600 | Wauseon | 4300 |
| Willard | 3650 | Paulding | 4300 |
| Cortland | 3850 | Carroll | 4400 |
| Enterprise | 3850 | Strongsville | 4450 |
| Holgate | 3900 | Woodsfield | 4500 |
| Ravenna | 3900 | Owensville | 4500 |
| Bryan | 3900 | London | 4550 |
| Delaware | 3950 | Columbus | 4550 |
| Wooster | 4050 | Germantown | 4650 |
| St. Clairsville | 4050 | Athens | 4700 |
| Marietta | 4050 | Venice | 4750 |

## *EVAPORATION IN VARIOUS RAINFALL ZONES*

Some of the effects of rainfall on evaporation are illustrated by the data of Tables 11 and 12. In Table 11 the average evaporation totals corresponding to various rainfall groupings are indicated. The various stations were first arranged in groups according to the total rainfall occurring at each of them for the 16-week period of the survey. The average evaporation totals for each group were then determined. These evaporation averages for the 4 years 1928 to 1931, inclusive, were next arranged in columns under the various rainfall divisions. It may be noted that the evaporation increased with a decrease in rainfall in a regular manner in 1928, 1930, and 1931; however, in 1929 this was not true. An average of 3 years when rainfall was comparatively normal shows the increase in evaporation with a decrease in rainfall to be regular, except between 9-12 and 6-9 inches of rainfall, where a decrease in evaporation accompanied a decrease in rainfall. This discrepancy was possibly due to the fact that comparatively few stations were in this group in 1929, and, thus, a true average was not obtained. When the 4-year average is considered, the values occur in the order which would be expected. The evaporation-rainfall ratio values given in the lowest line of Table 11 illustrate the variations which may be expected to occur with different amounts of rainfall. As the average rainfall decreased from 18.67 to 8.07 inches, or approximately 57 per cent, the evaporation increased from 143 to 460 cubic centimeters, or about 220 per cent. In other words, evaporation increases with a decrease in rainfall in such a manner that halving the rainfall may be expected nearly to treble the value of the evaporation-rainfall ratio.

The procedure used in arranging Table 11 was followed for Table 12, except that yearly rainfall averages were considered in grouping the evaporation stations. These yearly values represent averages of 40 years of data collected by the U. S. Weather Bureau (2). The average evaporation values vary

**TABLE 11.—Average Evaporation Values Corresponding to Various Rainfall Groupings for Each Year From 1928 to 1931, Inclusive**

| Period | Inches of rainfall | | | | | | Average rainfall for 16-week period |
|---|---|---|---|---|---|---|---|
| | Under 6 | 6–9 | 9–12 | 12–15 | 15–18 | 18–21 | |
| 1928 | .......... | .......... | 2743 | 2560 | 2444 | 2333 | 14.56 |
| 1929 | .......... | 2737 | 2969 | 3013 | 2741 | .......... | 12.91 |
| 1930 | 4749 | 4696 | 4481 | .......... | .......... | .......... | 7.14 |
| 1931 | .......... | .......... | 3555 | 3287 | 3123 | 3015 | 14.47 |
| Average of three "normal" years (1928, 1929, 1931) | .......... | 2737 | 3089 | 2953 | 2769 | 2674 | .......... |
| Average of all four years | 4749 | 3717 | 3437 | 2953 | 2769 | 2674 | .......... |
| Average rainfall | 5.38 | 8.07 | 10.66 | 13.43 | 16.25 | 18.67 | .......... |
| Evaporation-rainfall ratio | 883 | 460 | 322 | 220 | 170 | 143 | .......... |

**TABLE 12.—Average Evaporation for Stations Located in Various Rainfall Zones in Ohio**

(These zones have been established by 40 years of rainfall records)

| Period | Yearly rainfall averages, in inches | | | | |
|---|---|---|---|---|---|
| | Under 33 | 33–36 | 36–39 | 39–42 | Over 42 |
| 1928 | 2739 | 2782 | 2614 | 2327 | 1610 |
| 1929 | 2804 | 3488 | 2913 | 2841 | 2175 |
| 1930 | 4654 | 4961 | 4793 | 4426 | 4184 |
| 1931 | 3681 | 3722 | 3252 | 2978 | 2339 |
| 1928–1929–1931 average | 3075 | 3331 | 2926 | 2715 | 2041 |
| Four-year average | 3470 | 3738 | 3393 | 3143 | 2577 |

as would be expected with an increase in yearly rainfall from 33-36 to over 42 inches, but those stations located in the rainfall zone designated as under 33 inches showed an average evaporation below those in the 33 to 36-inch zone. No explanation for this is apparent, but, since there were very few stations located in the driest zone, it is possible that they were not sufficiently representative of the area involved. The data indicate that evaporation during the summer period is lower in areas which normally receive a high yearly rainfall than in others which usually receive smaller amounts of rain.

## *COMPARATIVE EVAPORATION IN NORTHERN, CENTRAL, AND SOUTHERN OHIO*

Early in this survey it was noted that the evaporation rate at various stations in the northern part of Ohio, particularly at some of those near Lake Erie, was somewhat greater than that for many of the stations in the southern part of the State; whereas the rates in the central part of the State were intermediate. This difference was even more noticeable when the E/R values were considered, largely because of the fact that the rainfall values were lower along Lake Erie than along the Ohio River. The values for the three factors of evaporation, rainfall, and the evaporation-rainfall ratio for the 4 years 1928 to 1931, inclusive, are shown in Table 13. During the drouth year of 1930 the condition in regard to evaporation was reversed, the rates being somewhat higher along the River than along the Lake. However, the rainfall was also higher in the former area, and, as a result, the value of E/R remained greatest along the Lake but was greater along the Ohio River than in central Ohio. In both the 3- and 4-year averages it will be noted that the evaporation was highest and the rainfall lowest at the Lake stations and that the E/R values for these periods are approximately 25 per cent greater along Lake Erie than along the Ohio River.

**TABLE 13.—Average Values of Evaporation, Rainfall, and Evaporation-Rainfall Ratio for "Lake", "Central", and "Ohio River" Sections of Ohio***

| Year | Evaporation | | | Rainfall | | | Evaporation-rainfall ratio | | |
|---|---|---|---|---|---|---|---|---|---|
| | Lake | Central | Ohio River | Lake | Central | Ohio River | Lake | Central | Ohio River |
| 1928 | 2684 | 2649 | 2043 | 12.33 | 15.09 | 16.29 | 218 | 176 | 125 |
| 1929 | 3131 | 3029 | 2587 | 12.49 | 13.32 | 12.15 | 251 | 227 | 213 |
| 1930 | 4464 | 4716 | 4617 | 5.85 | 7.64 | 6.77 | 763 | 617 | 682 |
| 1931 | 3594 | 3235 | 3014 | 12.13 | 14.84 | 15.34 | 296 | 218 | 196 |
| 1928–1929–1931 average | 3136 | 2971 | 2548 | 12.32 | 14.42 | 14.59 | 255 | 206 | 175 |
| Four-year average | 3468 | 3407 | 3065 | 10.70 | 12.72 | 12.64 | 324 | 268 | 242 |

*Lake and Ohio River sections include all stations within 30 miles of the shore lines and Central section includes the remainder of the State.

A summary of the values of other factors besides rainfall which influence the evaporation rate is given in Table 14. This table includes data for 4 years on wind velocity, mean temperature, mean relative humidity, and hours of sunshine per month for the 16-week period of the survey at Cleveland and Toledo on Lake Erie, at Cincinnati and Parkersburg on the Ohio River, and at Columbus and Dayton in the south-central part of the State. In addition to rainfall,

TABLE 14.—Values Representing Various Environmental Factors Which Influence the Evaporation Rate Near Lake Erie, in Central Ohio, and Along the Ohio River. Averages from May to September, Inclusive, for 4 Years, 1928-1931

| Year | Wind velocity Miles per hour | | | Mean temperature °F. | | | Mean relative humidity Per cent | | | Sunshine Hours (per month) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cleveland and Toledo | Columbus and Dayton | Cincinnati and Parkersburg | Cleveland and Toledo | Columbus and Dayton | Cincinnati and Parkersburg | Cleveland and Toledo | Columbus and Dayton | Cincinnati and Parkersburg | Cleveland and Toledo | Columbus and Dayton | Cincinnati and Parkersburg |
| 1928...... | 9.7 | 7.1 | 4.8 | 66.0 | 68.0 | 68.8 | 68 | 69 | 72 | 300 | 260 | 248 |
| 1929...... | 10.4 | 7.0 | 4.5 | 65.9 | 67.9 | 68.6 | 68 | 70 | 72 | 292 | 270 | 230 |
| 1930...... | 10.9 | 7.3 | 4.8 | 69.0 | 71.2 | 71.9 | 60 | 60 | 59 | 304 | 292 | 292 |
| 1931...... | 10.2 | 6.9 | 4.4 | 69.5 | 71.3 | 70.3 | 66 | 68 | 71 | 280 | 277 | 277 |
| Average | 10.3 | 7.1 | 4.6 | 67.6 | 69.6 | 70.3 | 65.5 | 66.8 | 68.5 | 294 | 275 | 262 |

the factors of wind velocity, relative humidity, and sunshine all favor a higher evaporation along Lake Erie than along the Ohio River. Only the mean temperature, which is highest along the River, favors a higher evaporation rate there than along the Lake. The difference in wind velocity is greatest of all the factors concerned and is twice as great along the Lake as along the River.

The average values of E/R for all stations for the 16-week periods during which they were placed during the years of 1926, 1927, 1928, 1929, and 1931 were determined, and these values were then used in constructing the map shown in Figure 4[3]. The region along Lake Erie is again indicated to be the driest part of the State. The E/R value of 250 for this region corresponds to an R/E value of approximately 0.76. The central part of the State, with the exception of a small area including Columbus, has an E/R value varying between 150 and 200. This means that water was lost here at much the same

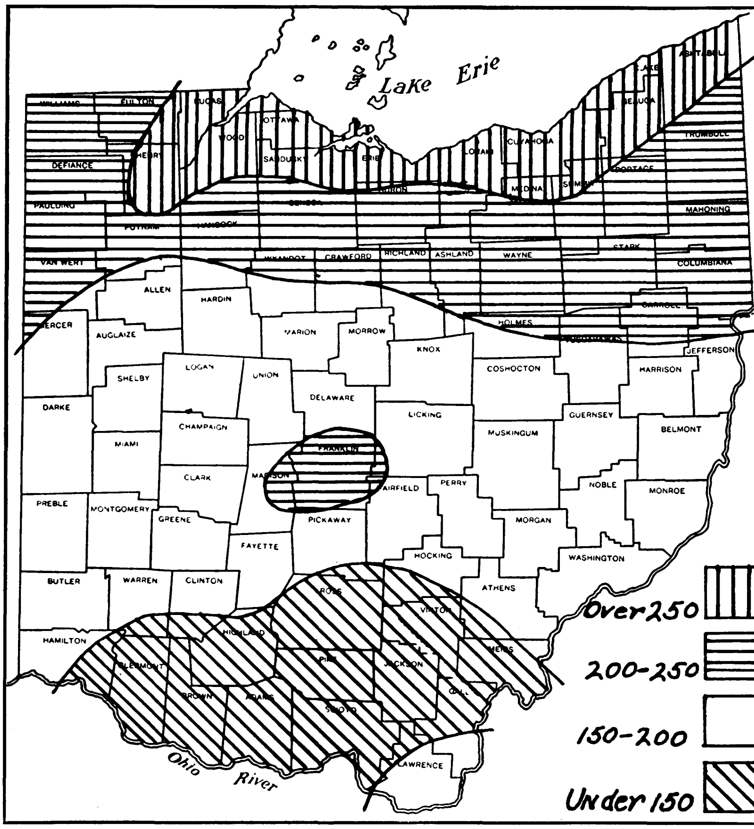


**Fig. 4.—Average values of the evaporation-rainfall ratio over a 5-year period (1926 to 1931, except for 1930) at stations located in various points in Ohio**

[3]It must be remembered that these areas have been defined on the basis of data collected only over a period of 5 years, and for this reason their boundaries cannot be considered as any more than approximations.

rate as it was received, during the 16-week period from May 24 to September 14. A somewhat wetter area was indicated in southern Ohio where the E/R value was less than 150, or an R/E value greater than 1.27. The E/R values for the period of the survey in 1928, which was a representative year from the standpoint of evaporation totals, were used in constructing the map of Figure 5. This map also illustrates the division of the State into three zones of dry-

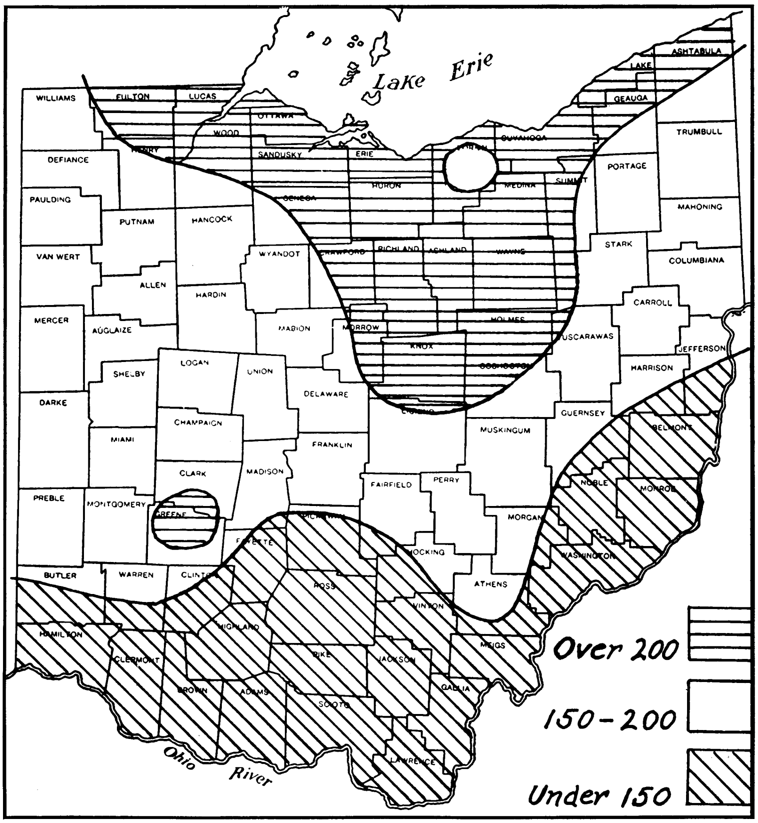


**Fig. 5.—Evaporation-rainfall ratio values at various points in Ohio during the summer of 1928**

ness with the driest area in the north, an intermediate zone in the central part of the State, and the smallest E/R values over most of the territory bordering the Ohio River. The year 1930, especially for the period involved in these surveys, was very dry, with extremely low rainfall and high evaporation rates over all of the State. The dry area in the north persisted, but the southern part of the State was equally dry in this year. Because of the prevalence of conditions during 1930 which were so different from those governing the other 5 years of the survey, the data for this year were not included in determining the values used in making the map of Figure 4. Instead, the E/R values of 1930 are represented in Figure 6. The central part of the State and an area

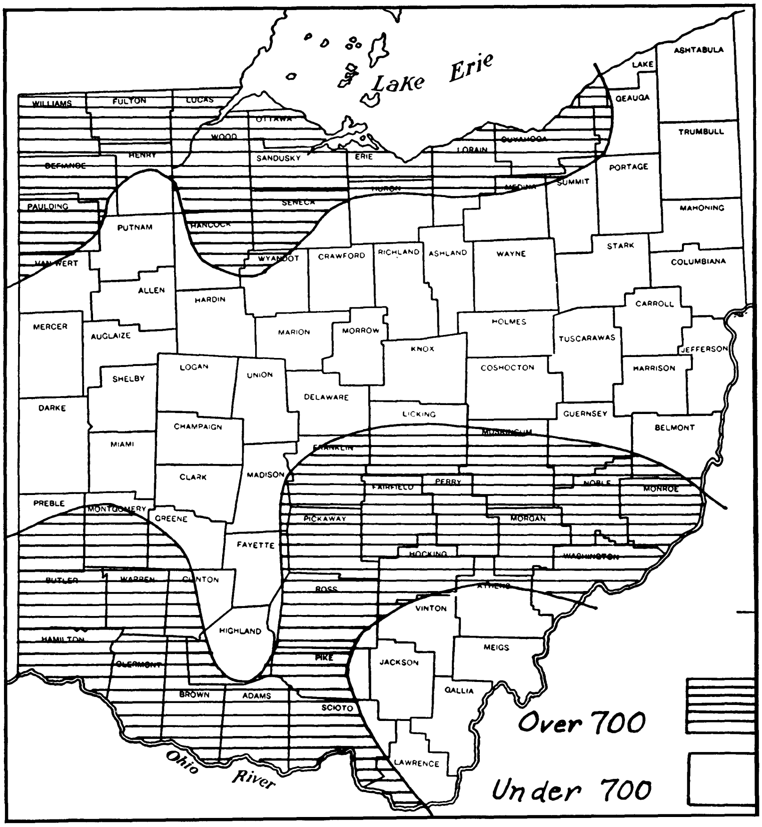


**Fig. 6.—Evaporation-rainfall ratio values at various points in Ohio during the summer of 1930**

in southeastern Ohio were least dry during 1930, but even there the E/R values ranged from 700 down to a minimum of 390, or an average value of R/E in the neighborhood of 0.35. The average E/R value for the State in 1930 was 654, which corresponds to an R/E value of 0.29. If such a condition prevailed over any extended period, the vegetation of Ohio would finally assume the characteristics of a prairie or even of a semi-desert region (36).

## *EVAPORATION AND FOREST TYPE*

The possible relationships existing between the distribution of vegetation types and the rainfall and evaporation rates have been examined by Livingston (38, 39, 42), Pearson (53), Russell (58), Sampson (59), Shantz (61), and Transeau (76, 77). When the area involved was large and the differences in rainfall were great, distinct correlations between vegetation types and rainfall and evaporation (i. e., the rainfall-evaporation ratio) were found to exist (42, 61, 76). Similar correlations were noted in more restricted areas by Pearson (53) and Sampson (59).

The average values of evaporation, rainfall, and evaporation-rainfall ratios for stations located in the three comparatively distinctive types of climax forest in Ohio (oak-hickory, beech-maple, and swamp forest) are shown in Table 15. Only the 4 years 1928 to 1931, inclusive, are considered, since the data of 1926 and 1927 were not complete. As may be noted, the evaporation rate was slightly greater at the oak-hickory stations than at those located in either beech-maple or swamp forest areas, but the differences are not significant. The rainfall is slightly greater at the former stations also. As a result, the E/R values in the various zones were quite similar. The average rainfall totals for the 6-month period from April 1 to September 30 for the 5 years 1927 to 1931, inclusive, at stations located in each of the three types of forest areas in the northern half of Ohio were 20.02, 19.34, and 18.10 inches in oak-hickory, beech-maple, and swamp forest, respectively.

The data of Table 15 indicate that, in an area no larger than Ohio and with no greater differences in latitude and altitude than exist within its borders, the differences in rainfall and evaporation are not very great and that the small variations which may exist do not play the determining rôle in delimiting vegetation zones and regulating the development of particular climax forest types.

**TABLE 15.—Relation of Forest Type to Evaporation, Rainfall, and Evaporation-Rainfall Ratio**

| Period | Evaporation | | | Rainfall | | | E/R | | |
|---|---|---|---|---|---|---|---|---|---|
| | Oak-Hickory | Beech-Maple | Swamp forest | Oak-Hickory | Beech-Maple | Swamp forest | Oak-Hickory | Beech-Maple | Swamp forest |
| | *Cc.* | *Cc.* | *Cc.* | *In.* | *In.* | *In.* | | | |
| 1928...... | 2648 | 2503 | 2658 | 13.87 | 15.69 | 12.95 | 191 | 159 | 205 |
| 1929...... | 3038 | 3031 | 2855 | 14.05 | 12.53 | 13.55 | 216 | 242 | 211 |
| 1930...... | 4943 | 4767 | 4370 | 7.04 | 7.24 | 6.83 | 702 | 658 | 640 |
| 1931...... | 3364 | 3221 | 3491 | 15.88 | 14.58 | 12.35 | 212 | 221 | 283 |
| Average | 3498 | 3380 | 3344 | 12.71 | 12.51 | 11.42 | 275 | 270 | 294 |

## *EVAPORATION AND CROP YIELDS*

The relation of rainfall and evaporation to the yield of crops has been studied in detail by various investigators (6, 7, 8, 35, 47, 73). Rainfall becomes an important factor in limiting crop production over large areas in the United States even in years of normal rainfall, and in years of low rainfall, such as 1930 and 1934 (1), the area is often greatly extended. The amount of rainfall occurring yearly in a given region is not a sufficient criterion of its ability to produce a given crop or crops. The time at which the rainfall occurs is very important in governing the ability of certain comparatively dry areas in the United States and Canada to produce a good crop of wheat (7, 35, 36). In other regions where rainfall is more plentiful (as in Ohio), the amount of rain falling within very restricted time limits (in relation to the stage of crop development) is very important in determining the yields of such crops as wheat and corn (6, 47, 73). The rate at which water is lost from plant and soil surfaces is also important in determining the suitability of a region for the production of specific crops. Thus, in areas of comparable rainfall, the evaporation may be so different that a crop which can be grown profitably in a region of comparatively low evaporation would be a failure in another with a higher evaporation rate (8, 35).

The data collected in this survey afforded an opportunity to study possible relationships between rainfall and evaporation totals over certain restricted periods during the growth of a crop and the yield of that crop. However, the fact that only 4 years are covered by the survey makes it impossible to make such a study very complete. It was impossible to include the grain crops of wheat, rye, oats, and barley, since the growth of these is influenced to too great an extent by conditions which precede May 25, the approximate date when the evaporation survey began each year.

The crops used in this study and the periods involved are shown in Table 16. The yield data were obtained from a bulletin dealing with agricultural statistics in Ohio (56). The evaporation and rainfall values for the restricted periods used were calculated from the data of Tables 3 and 4. The summer of 1930 was very dry in Ohio, and it will be noted that the yields of all six crops were low that year. Since alfalfa grows over all of the period included in the survey, the 16-week values of Table 6 could be used. Although the weather for some time previous to May 25 is influential in determining the size of the first cutting of alfalfa, it will be noted that the total yields and the values of E/R are in the same order. On the basis of rainfall values alone, the yield of 1931 should have been considerably higher than that of 1929, but it is likely that the higher evaporation rate of the former year offset the effectiveness of a higher rainfall so that the two yields were nearly equal, as the E/R values indicate they should have been. However, in 1928 the yield was lower than in 1929 in spite of a lower rainfall and higher evaporation rate and a higher value of E/R. Smith (73) found the corn yield of Ohio to be influenced most by the weather (rainfall in particular) between July 11 and August 10, or a period of 30 days. In Table 16 a period of 42 days, from July 7 to August 18, has been used. With this crop the rainfall totals alone were a better criterion of yield over a period of 4 years than are the E/R values. The low evaporation rate of 1928 gave a small E/R value which would indicate that the yield in that year should have been nearly as great as in 1931, but actually it was much smaller. The average rainfall for the State (52) for the months of April and May was 4.83 and 7.38 inches for 1928 and 1931, respectively, and it is likely that the larger total for the latter year was in part responsible for the larger corn yield in 1931. The E/R values for the period from August 11 to September 8 indicate the yield of buckwheat should have been slightly larger in 1928 than in 1930; whereas, on the basis of rainfall alone, the yields should have been reversed. However, the low evaporation of 1928 and the high rate of 1930 offset the difference in rainfall in favor of 1930, and, as a result, the lower yield occurred during that year. Only the evaporation values indicate that the yield of 1929 should have been lower than that of 1928; whereas the rainfall and E/R values favor a lower yield in 1928. When soybeans are considered, all values indicate the lowest yield in 1930 and the highest in 1931, which was the case. Rainfall data favor a slightly lower yield in 1928 than in 1929, but a higher evaporation rate in the latter year offset the beneficial effect of a somewhat greater rainfall. The yields of tobacco during the 4 years considered are in the order which rainfall values between July 21 and September 1 indicate; whereas E/R values suggest a reversal of yield values in 1928 and 1929. Grain hay is included here since it is often planted a little later than the crops harvested for grain only. When the evaporation and rainfall data for the first 4-week period of the survey are considered, both the rainfall and E/R values indicate that the yields should be in the order they are. A summary of the data involving these six crops indicates that the use of the evaporation-rainfall ratio did not make it possible to rank their average yields to any better advantage than did the rainfall data alone. Perhaps little more should be expected with the comparatively small number of evaporation stations and years of data available.

**TABLE 16.—Relation of Evaporation, Rainfall, and Evaporation-Rainfall Ratio to Acre Yields of Various Crops in Ohio from 1928 to 1931**

| | Evaporation | Rainfall | E/R | Yield | Evaporation | Rainfall | E/R | Yield |
|---|---|---|---|---|---|---|---|---|
| | Cc. | In. | | | Cc. | In. | | |
| | Alfalfa, tons (May 25–Sept. 15) | | | | Corn, bushels (July 7–Aug. 18) | | | |
| 1928 | 2528 | 14.56 | 174 | 1.90 | 938 | 5.07 | 185 | 35.5 |
| 1929 | 2926 | 12.91 | 227 | 1.94 | 1141 | 3.94 | 290 | 34.5 |
| 1930 | 4673 | 7.14 | 654 | 1.30 | 2126 | 2.26 | 941 | 25.5 |
| 1931 | 3246 | 14.47 | 224 | 1.95 | 1238 | 6.56 | 189 | 45.0 |
| | Buckwheat, bushels (Aug. 11–Sept. 8) | | | | Soybeans, bushels (July 28–Sept. 8) | | | |
| 1928 | 662 | 1.72 | 385 | 18.5 | 988 | 3.13 | 315 | 15.0 |
| 1929 | 712 | 2.45 | 290 | 15.0 | 1086 | 3.60 | 302 | 15.0 |
| 1930 | 911 | 2.25 | 405 | 14.0 | 1635 | 2.92 | 560 | 14.0 |
| 1931 | 690 | 3.44 | 201 | 21.0 | 1057 | 5.96 | 177 | 20.0 |
| | Tobacco, pounds (July 21–Sept. 1) | | | | Grain hay, tons (May 25–June 23) | | | |
| 1928 | 979 | 3.48 | 281 | 862 | 554 | 5.72 | 97 | 1.00 |
| 1929 | 1123 | 3.63 | 309 | 868 | 756 | 2.37 | 319 | 0.91 |
| 1930 | 1773 | 3.05 | 581 | 760 | 1067 | 1.87 | 571 | 0.60 |
| 1931 | 1123 | 6.27 | 179 | 954 | 817 | 3.06 | 267 | 0.99 |

## *EVAPORATION AT SITES OF DIFFERENT EXPOSURE*

During the progress of this survey, at certain stations atmometers were placed on sites with different degrees of exposure. In the general survey one set of instruments was always located at a site with as great exposure as it was conveniently possible to obtain, but in a few instances they were also located in orchards, pastured woodlots (open stands of trees), and comparatively dense stands of trees, either naturally seeded or artificially planted. It has been repeatedly demonstrated by various workers that evaporation varies widely in different plant habitats. Evaporation rates in bogs have been studied, among others, by Dachnowski (12), Dickey (15), Gates (21), Sherff (67), and Yapp (90); those in prairie formations by Fuller (17), Harvey (25), and Weaver (80); and others in dunes by Fuller (17), Harvey (25), and McNutt (50). Comparative evaporation rates in a variety of habitats, plant associations, or successions have been recorded by many (17, 18, 19, 25, 45, 71, 77). The influence of the height above the ground level at which the instruments were placed on the evaporation rate which might be expected in various habitats has been observed by others (12, 21, 25, 54, 67, 90).

Comparative evaporation rates in two or more sites at Marietta, Wooster, Bryan Park, Shawnee Forest, and Waterloo Forest are shown in Table 17. The first two stations mentioned were located at forest nurseries and the last three in state forests. The instruments in the orchard at Marietta were placed under the crown of a half-grown apple tree where the evaporation rate was found to be approximately half that in the open. At Waterloo Forest the

TABLE 17.—Evaporation from Spherical White Atmometers on Different Sites at Particular Stations in 1928 and 1930

1928

| | Marietta | | Waterloo | | Bryan Park | | |
|---|---|---|---|---|---|---|---|
| | Open | Orchard | Open | Pine planting | Open | Pastured woodlot | Dense woods |
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| 5/29-6/ 4 | 171 | 85 | 102 | 54 | 196 | 84 | 67 |
| 6/ 5-6/11 | 97 | 46 | 50 | 26 | 108 | 38 | 29 |
| 6/12-6/18 | 189 | 87 | 119 | 52 | 244 | 142 | 77 |
| 6/19-6/25 | 94 | 35 | 47 | 13 | 116 | 48 | 20 |
| 6/26-7/ 2 | 126 | 54 | 104 | 32 | 149 | 78 | 39 |
| 7/ 3-7/ 9 | 166 | 68 | 136 | 35 | 206 | 111 | 45 |
| 7/10-7/16 | 127 | 54 | 98 | 31 | 224 | 114 | 53 |
| 7/17-7/23 | 151 | 72 | 116 | 32 | 182 | 100 | 45 |
| 7/24-7/30 | 157 | 75 | 163 | 56 | 223 | 112 | 57 |
| 7/31-8/ 6 | 131 | 53 | 188 | 24 | 240 | 113 | 45 |
| 8/ 7-8/13 | 133 | 54 | 140 | 54 | 250 | 118 | 61 |
| 8/14-8/20 | 133 | 54 | 98 | 51 | 229 | 124 | 55 |
| 8/21-8/27 | 150 | 62 | 124 | 28 | 267 | 152 | 65 |
| 8/28-9/ 3 | 166 | 70 | 116 | 41 | 225 | 132 | 58 |
| 9/ 4-9/10 | 120 | 51 | 158 | 44 | 233 | 140 | 63 |
| 9/11-9/17 | 170 | 82 | 134 | 43 | 336 | 200 | 84 |
| 4-week totals | | | | | | | |
| 5/29-6/25 | 551 | 253 | 318 | 145 | 664 | 312 | 193 |
| 6/26-7/23 | 570 | 252 | 454 | 130 | 761 | 343 | 182 |
| 7/24-8/20 | 554 | 236 | 589 | 185 | 942 | 467 | 218 |
| 8/21-9/17 | 606 | 265 | 532 | 156 | 1061 | 624 | 270 |
| 16-week total | 2281 | 1006 | 1893 | 616 | 3428 | 1746 | 863 |

1930

| | Wooster | | Shawnee Forest | |
|---|---|---|---|---|
| | Open | Woodlot | Open | Woodlot |
| | *Cc.* | *Cc.* | *Cc.* | *Cc.* |
| 5/26-6/ 1 | 164 | 101 | 220 | 100 |
| 6/ 2-6/ 8 | 348 | 214 | 146 | 60 |
| 6/ 9-6/15 | 388 | 256 | 146 | 60 |
| 6/16-6/22 | 191 | 124 | 215 | 80 |
| 6/23-6/29 | 245 | 164 | 274 | 119 |
| 6/30-7/ 6 | 247 | 140 | 355 | 154 |
| 7/ 7-7/13 | 322 | 192 | 289 | 129 |
| 7/14-7/20 | 428 | 282 | 396 | 207 |
| 7/21-7/27 | 352 | 199 | 285 | 130 |
| 7/28-8/ 3 | 398 | 259 | 230 | 120 |
| 8/ 4-8/10 | 373 | 217 | 197 | 120 |
| 8/11-8/17 | 303 | 176 | 419 | 181 |
| 8/18-8/24 | 199 | 116 | 162 | 69 |
| 8/25-8/31 | 199 | 150 | 332 | 172 |
| 9/ 1-9/ 7 | 243 | 129 | 392 | 200 |
| 9/ 8-9/14 | 248 | 154 | 126 | 42 |
| 4-week totals | | | | |
| 5/26-6/22 | 1091 | 695 | 727 | 300 |
| 6/23-7/20 | 1242 | 778 | 1314 | 609 |
| 7/21-8/17 | 1426 | 851 | 1131 | 551 |
| 8/18-9/14 | 889 | 549 | 1012 | 483 |
| 16-week total | 4648 | 2873 | 4184 | 1943 |

instruments were placed well within a dense stand of white pine trees which had been planted about 10 years previously. Here the evaporation was only about one-third that in the open. At Bryan Park the atmometers were placed in three quite different degrees of exposure. The evaporation in an open stand of deciduous hardwoods was only one-half that in the fully exposed site;

whereas in a dense stand of second-growth trees of the same species complex, it was only one-fourth as great as in the open. At Wooster one set of instruments was placed in the center of a small group of hardwoods where shade was dense but air circulation was good. The evaporation rate in this situation was about three-fifths that in the open. At Shawnee State Forest instruments placed in a medium stand of second-growth hardwoods lost about half as much water as others freely exposed. These results indicate that the evaporation rate from the white atmometer in open woodlots may be expected to be about one-half as great as in well exposed sites and that it may not be more than one-fourth as great in comparatively dense stands of half-grown trees.

## SUMMARY

An evaporation survey of Ohio, covering a period of 6 years (1926 to 1931, inclusive), has been made with varying degrees of completeness in the different years by various investigators in the Ohio Agricultural Experiment Station, the Ohio State University, and the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture. The original purpose of the survey was to determine some of the relationships existing between evaporation rates and the distribution and prevalence of certain insects, such as the European corn borer (*Pyrausta nubilalis* Hubn.) and the Mexican bean beetle (*Epilachna corrupta* Muls.). It was later completed as a general study of some of the ecological conditions existent in Ohio.

The Livingston type of standardized atmometers, both black and white, equipped with non-absorbing valves, were used as evaporimeters. The evaporation rate was determined each summer between the approximate dates of May 25 and September 20, or a period of 16 weeks. The points at which the evaporation stations were placed were distributed as evenly over the State as it was convenient to locate them. Losses from the individual instruments were determined each Monday morning during the survey periods. The average weekly losses, together with four 4-week periods and the 16-week totals were recorded for each station. The corresponding rainfall totals were calculated later from data furnished by the Weather Bureau, and these are also given in the text.

The rates of rainfall and evaporation for the various stations have been compared in the form of a rainfall-evaporation ratio. This furnished a better criterion of the moisture conditions governing plant growth than would have been possible with either factor alone. For convenience the commonly used R/E ratio has been inverted in this discussion and stated as the number of cubic centimeters of evaporation corresponding to an inch of rainfall, or E/R. This ratio has an average value varying between approximately 50 and 1400 at certain stations for the various 16-week periods. An E/R value of 190 is approximately equivalent to that of 1.00 for R/E. A summary of these data relative to the E/R ratio shows its average value to have been 174 in 1928 and 654 in 1930. The latter was a year of severe drouth in Ohio; whereas the rainfall was quite normal during the summer of 1928. The high value of 1930 was brought about by a rainfall only one-half the normal and an evaporation at least 50 per cent greater than the average of the more normal years of 1928, 1929, and 1931. For the 5-month period of the survey in 1930 the evaporation rate was approximately 3.75 times as great as the rainfall.

The average evaporation total for the 4-year period (1928 to 1931, inclusive) varied only from 2600 to 3900 cubic centimeters for the 17 stations which were maintained during all of these years. A difference of 650 cubic centimeters is required for a significant variation. The average rate of water loss for these stations was quite different during the different years, however, it being 2500, 3000, 4800, and 3300 cubic centimeters, respectively, for 1928, 1929, 1930, and 1931.

A grouping of the evaporation stations in the various rainfall zones established during 40 years of weather records indicates that evaporation during the summer period is generally highest in regions having low yearly rainfall and lowest in those with higher rainfall, as shown in Table 12. This correlation between rainfall and evaporation was, as would be expected, even more marked when the rainfall for the period of the survey only was considered, as is shown in Table 11.

When the stations were grouped according to geographical boundaries (with those within 30 miles of Lake Erie in one group, those within the same distance of the Ohio River in another, and the remainder in one large group), the evaporation was found to be highest along the Lake, lowest along the River, and intermediate over the remainder of the State. An analysis of some of the environmental factors which are important in regulating the evaporation rate shows all of them to favor a higher rate near Lake Erie than in the Ohio River valley, with the exception of temperature. This was especially true of wind, the velocity of which was twice as great along the Lake as in the River valley.

A comparison of evaporation rates at sites representative of various forest types showed very little variation to exist. The differences were most marked in 1930 when oak-hickory areas had the highest evaporation rate, swamp forest the lowest, and beech-maple intermediate. These values were in the same relative order in a 4-year average (1928-1931), but the differences in rate in the three types were small.

A comparison of crop yields and data relative to evaporation-rainfall ratios indicated that yields could be predicted or ranked with but little more accuracy than could be done by using rainfall data alone. However, unpublished data have indicated that the use of the ratio values is more reliable than rainfall alone in predicting yields for restricted areas, such as a single farm. Evaporation records taken at sites having different exposures, such as open fields, pastured woodlots, and dense woods, indicate that the rate may be expected to be about one-half as great in pastured woodlots as in exposed situations and that the former will be again halved in rather dense stands of trees.

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